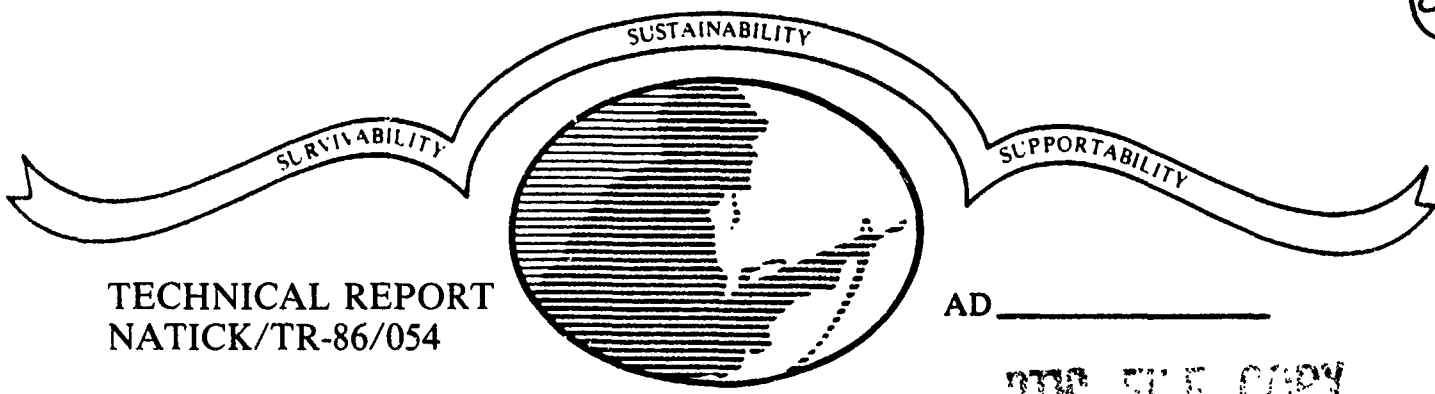


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TECHNICAL REPORT  
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SELECTION OF DIMENSIONS FOR AN ANTHROPOMETRIC  
DATA BASE  
VOLUME II: DIMENSION EVALUATION SHEETS

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BY

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MAY 1986

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SEPTEMBER 1984 TO OCTOBER 1985

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## SELECTION OF DIMENSIONS FOR AN ANTHROPOMETRIC DATA BASE

### VOLUME II: DIMENSION EVALUATION SHEETS

#### INTRODUCTION

To meet the demands for anthropometric data describing their personnel, the U.S. military services periodically conduct large-scale multipurpose body-size surveys. The central purpose of this study is to provide guidelines for the selection of measurements to be included in a new anthropometric survey currently being planned by the U.S. Army to update its existing data base.

A primary step in selecting dimensions to be recommended for measurement was the critical review of dimensions measured in previous surveys. The following 14 surveys were selected for detailed examination:

- Air Force Women - 1968<sup>1</sup>
- Army Aviators - 1970 (male)<sup>2</sup>
- Army Personnel - 1966 (male)<sup>3</sup>
- Army Women - 1977 (includes male subsample)<sup>4</sup>
- Australian Tri-Service (RAA) - 1977 (male)<sup>5</sup>
- British Army Surveys (RA) - 1972/76 (male)<sup>6</sup>
- Canadian Forces (CF) - 1974 (male)<sup>7</sup>
- Health and Nutrition Examination Survey (HANES) - 1971/74 (male and female)<sup>8</sup>
- Health Examination Survey (HES) - 1959/62 (male and female)<sup>9,10</sup>
- Royal Air Force (RAF) - 1970/71 (male)<sup>11</sup>
- USAF Flying Officers - 1967 (male)<sup>12</sup>
- USN Aviators - 1964 (male)<sup>13</sup>
- Department of Agriculture, Bureau of Home Economics - 1939/40 (female)<sup>14</sup>
- Federal Republic of Germany (FRG) - 1970/71 (male)<sup>15</sup>

All the dimensions measured in these surveys were studied and evaluated for their potential usefulness in the proposed Army survey. These 14 surveys were chosen on the basis of their sample size ( $n > 500$ ), the number of dimensions measured (representing both highly selective and more comprehensive collections), measuring techniques (representing both U.S. and British methods), and recentness.

Emphasis was placed on military surveys since they were the most likely to contain dimensions of utility for an Army anthropometric data base. The Health Examination Survey (HES) and the Health and Nutrition Examination Survey (HANES) were included since the National Health surveys, conducted every 10 years, provide the only anthropometric data purported to be representative of the U.S. adult civilian population. Though not contemporary, the 1939/40 anthropometric survey of U.S. women sponsored and supervised by the Bureau of Home Economics was added to the list because the dimensions measured in it are often used in the design and construction of women's clothing, and the data resulting from it serve as the basis for garment pattern standards promulgated by the Bureau of Standards. Furthermore, in many respects it serves as a model for subsequent anthropometric surveys of military personnel.

A dimension evaluation sheet was prepared for each of 362 dimensions. These appear in this volume in alphabetical order by dimension name as listed in Table I of Volume I. If a dimension was named differently in the original source(s), its name follows the listed name in parentheses. (Differences in names of types of dimensions such as circumferences vs. girths, breadths vs. widths or diameters, and arcs vs. curvatures are not preserved.)

The surveys under scrutiny fell into three categories -- U.S. military, foreign military, and U.S. civilian. Where a dimension was measured in all three groups of surveys, it is treated three times. Thus, commonly measured variables such as Stature or Weight will appear, in alphabetical order, on three evaluation sheets (e.g. Stature - U.S. military, Stature - foreign military, and Stature - U.S. civilians).

#### PROCEDURES FOR EVALUATING DIMENSIONS

A detailed explanation of the information recorded on the forms for U.S. military surveys appears below. (The forms for foreign military and U.S. civilian surveys are somewhat truncated since these measurement data have not been analyzed for correlations with U.S. Army data, or race and gender sensitivity.)

- A. 1. DESCRIPTION: a short description of the dimension in lay terms.
- A. 2. BODY POSITION: For obtaining comparable measurements of like dimensions, consistency of body position is often as critical as the definition and interpretation of landmarks. The significant aspects of the position of the body and/or a part of the body that affect the measurement are described for each dimension.

A type of shorthand is used in these descriptions in which the body position for many of the dimensions is indicated by either anthropometric standing or anthropometric sitting. These positions are described below for each survey.

#### Standard Anthropometric Positions

U.S. Military Anthropometric standing - subject stands erect without military stiffness; weight is distributed equally on both feet; heels together, or as close together as comfortable; head in the Frankfort plane; shoulders relaxed; upper extremities relaxed at sides with palms facing thighs.

Anthropometric sitting - subject sits erect on flat surface; head in the Frankfort plane; feet on an adjustable platform; knees flexed 90 degrees; thighs parallel, arms relaxed; forearms and hands extended forward horizontally.

Bureau of Home Econ. Anthropometric standing - subject stands erect without stiffness with feet as close together as comfortable; head in the Reid's base line (Frankfort plane); palms of hands on thighs.

Anthropometric sitting - Only two dimensions were measured in the sitting position: Sitting Spread Circumference and Bent Knee Circumference. The former was measured with the thighs fully supported by a sitting surface; the feet were unsupported. The latter was measured with the feet supported and the knees flexed 90 degrees.

HANES  
HES

Anthropometric standing - subject stands erect, heels together; back against a vertical measuring scale; head in the Frankfort plane; upper extremities hanging at sides.

Anthropometric sitting - subject sits erect; head in the Frankfort plane; heels and knees together; elbows flexed 90 degrees and held at sides; forearms and hands extended forward horizontally.

FRG

Anthropometric standing - subject stands erect with maximum stretch, feet together, and when appropriate, the head is in the Frankfort plane.

Anthropometric sitting - subject sits erect with maximum stretch, and when appropriate, the head is in the Frankfort plane; the thighs are completely supported and the lower legs hang free over the edge of the sitting surface. (No arm position described except where appropriate.)

CF

Anthropometric standing - subject stands erect without stiffness, heels together, head in the Frankfort plane.

Anthropometric sitting - subject sits erect, head in the Frankfort plane, upper arms hanging relaxed, forearms and hands extended forward horizontally. The thighs are parallel to each other and the knees are flexed 90 degrees.

RA

Anthropometric standing - subject stands fully erect, looking straight ahead; the feet are 8 cm. apart.

RAA

Anthropometric standing - subject stands erect looking straight ahead; heels together and back free of a wall.

RAF

Anthropometric standing - subject stands comfortably erect but not rigidly at attention; weight is distributed equally on both feet which are approximately 10 cm. apart.

RA  
RAA  
RAF

Anthropometric sitting - subject sits erect looking straight ahead; sitting surface is adjusted so that an imaginary line passing through the greater trochanter to the lateral femoral epicondyle is parallel to the floor. The thighs are parallel and the calves vertical with the feet on the floor. The shoulders are relaxed and elbows lightly held against the sides with the forearms extended so that the hands rest on the midthighs. ("Looking straight ahead" is comparable to the Frankfort plane and no distinction between the two is made in the dimension evaluation sheets).

It should be understood that, for a number of dimensions, the statement anthropometric sitting does not include all of the specific body part positions described in the definition. Examples of these are Knee Height Sitting, and Buttock-Knee Length, which are measurements taken on the legs of seated subjects where the anthropometric sitting position of the legs is critical, but the positions of the head and arms are not of particular significance; measurements in body positions defined as anthropometric standing for dimensions such as Buttock Circumference and Trochanteric Height do not require the head to be in the Frankfort plane but do require the other standardized positioning criteria. Significant features of body position and differences affecting the measurement of a dimension are always given in the description of body position in each dimension evaluation sheet.

- A. 3. LANDMARK(S): a mark placed on the body or body-surface feature used to identify the origin, end point, or level of a measurement.
- A. 4. INSTRUMENTS/EQUIPMENT: the instrument and/or equipment used to measure a dimension.
- A. 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: a statement calling attention to the differences described in Body Position, Landmark(s), or Instruments/Equipment that may affect the measurements. Differences between measuring techniques are described only for the surveys appearing on a single sheet. Differences between measuring techniques used in the surveys of U.S. military, foreign military, and U.S. civilians are not described. For differences between these categories, see the equivalent dimension evaluation sheet for each category.

ALTERNATIVES: dimensions that can serve a similar function.

- B., C. DATA: filled-in values indicate that the dimension was measured in a specific survey. Coefficients of variation, percentiles, and correlation statistics (with the exception of Stature, Estimated and Weight, Estimated) are given only for the U.S. Army 1966 and 1977 surveys. The data presented on the evaluation sheets for U.S. military personnel and from the HES and HANES surveys are from the Harry G. Armstrong Aerospace Medical Research Laboratory (AAMRL) anthropometric data bank. (The HES and HANES data are from subsamples of 18-45 year old subjects.) The values in the data bank were generated from the raw data of surveys that had been treated with editing routines, such as XVAL and EDIT which were developed by Anthropology Research Project, Inc. (ARP) for AAMRL. Summary statistics and correlation coefficients were calculated from the edited data. Therefore, the data shown on the sheets may not agree exactly with the data in the published reports of the surveys. Data from the other surveys reviewed are from the published reports of the surveys.

All data are in centimeters except for weight which is in kilograms, age which is in years, and slope (shoulder) which is in degrees. The coefficients of variation and the correlation coefficients (r) are dimensionless values.

D. THOUGHT TO BE OF Essential, Useful, OR Marginal VALUE TO A U.S. ARMY ANTHROPOMETRIC DATA BASE:

Marginal dimensions are those of which no known use has been made or that were measured to serve a unique or very limited purpose not considered germane to Army needs.

Useful is the rating given those dimensions of proven benefit in the design of clothing, personal equipment, workspaces, and two- and three-dimensional anthropomorphic analogues.

Essential is the rating assigned to those dimensions that are useful but also: (1) establish overall body size descriptions and distributions of a population and are particularly useful for comparing such distributions between populations, (2) serve as criteria for developing microcosms of populations used for special anthropometric studies including the test and evaluation of end items, (3) are used as key dimensions for the development of sizing systems and for the procurement and issuing of clothing and personal equipment, (4) determine critical design criteria required for the design and layout of workspaces, (5) are required for the development of either computer-generated or three-dimensional anthropomorphic analogues, or (6) may serve as body-size selection or elimination criteria for specific workspaces such as helicopter crewstations.

E. REASON FOR RATING: a statement supporting the ranking of a dimension as being of marginal, useful, or essential value for a U.S. Army data base.

F. RACE SENSITIVE (U.S. Military only): statements concerning the racial sensitivity of dimensions measured on U.S. military personnel are based primarily upon racial analyses of data from the 1965 survey of USAF men<sup>16</sup> and the 1966 Army surveys of U.S. Army, Navy and Marine men.<sup>17</sup> Long and Churchill<sup>16</sup> report the differences between 157 dimensions measured on 343 White and 343 Black men matched by Stature and Weight. (Most men in this sample were between 17 and 21 years old). Comparisons between Whites and Asians\* are based on a sample of 97 Whites and 97 Asians matched by Stature and Weight drawn from the 1966 surveys during which 70 dimensions were measured.<sup>17</sup> (These, too, were young men having a mean age of 21.1 years.)

Like comparisons were made between matched samples of 396 Whites and 396 Hispanics measured during the Army's 1966 surveys (their mean age was 20.9 years).<sup>17</sup> The data revealed a slight tendency for Whites to have shorter torsos and longer extremities than Hispanics of like body size, but not enough is yet known about this group to assess the effect of these differences on design.

Since Whites constitute the majority of Army personnel, Whites were considered as the base upon which comparisons were made. That is, a

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\*Asians as used here are those subjects who classified themselves as: Chinese, Guamanians, Hawaiians Japanese, Koreans, Filipinos, or simply Asians.<sup>18</sup>

typical race sensitive statement reads: "Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians."

The criterion for declaring a dimension to be race-sensitive is a difference between mean values equaling or exceeding 1.0 cm or one-half of a unit of the standard deviation of measurement for the White sample. Race-sensitive statements for dimensions not measured in a survey from which matched samples were drawn are based on similarities between body dimensions. For example, since matched-sample data demonstrate that Crotch Height is a race sensitive dimension between Whites and Asians, one can assume that Trochanteric Height, which was not measured in the U.S. Army 1966 surveys, also demonstrates a similar degree of sensitivity.

It should be noted that the racial composition of previous survey samples limits the types of racial comparisons that can be made with confidence. Both White and Black men are well represented in military surveys. However, there are too few Asians, Hispanics, and American Indians represented in those surveys to assess in detail the anthropometric uniqueness (or lack thereof) of these populations. Racial differences in body size of military women have never been documented at all. A new survey, demographically representative of the contemporary Army, should shed considerable light on this problem since relatively large samples of each population group, and both sexes, will have been measured by a single team of observers.

GENDER SENSITIVE (U.S. Military only): statements describing dimensions as being gender sensitive, with respect to their significance for design are based primarily on data reported by Robinette et al.<sup>19</sup> This study presents an analysis of anthropometric differences between men and women measured in the 1977 U.S. Army survey of women. [Forty-four dimensions were measured on a subsample of men for the express purpose of obtaining comparable data for men and women (i.e., data having the same inter/intra-observer errors using the same measuring techniques)]. From the subjects measured in this survey, a sample of 204 men and 204 women were matched by Stature and Weight. The same criterion used to classify a dimension as being race-sensitive is used to label a body dimension as gender-sensitive. Since only three head dimensions (Head Length, Head Breadth, Head Circumference) were among the forty-four dimensions measured, the classification of other head and face dimensions as being gender-sensitive was largely based on the authors' judgement. Judgements were based on comparisons of male and female head data from the 1965 and 1967 surveys of USAF men,<sup>16,12</sup> the 1968 USAF and 1977 U.S. Army surveys of women<sup>1,4</sup> and the authors' experience in developing sizing systems for personal-protective equipment worn on the head and/or face. No attempt was made to develop matched samples from the U.S. Army and USAF surveys since data generated from matched samples drawn from multiple surveys may be unreliable due to differences in measuring techniques and levels of observer error.

- G. REPRODUCIBILITY: an expression of the demonstrated or anticipated level of repeatability of a measurement, and the reason for the rating if it is B or C. "A" denotes a test/retest correlation  $\geq 0.90$ ; "B" denotes a

test/retest correlation of 0.80 - 0.89; "C" denotes a test/retest correlation  $\leq 0.79$ . Reliability studies were conducted during the 1965 survey of Air Force men<sup>16</sup> and the 1977 Australian Tri-Service survey.<sup>20</sup> During the Air Force study, 157 dimensions were measured twice on a group of 41 men undergoing basic training. This was primarily a study of intra-observer error. The Australian effort represents both intra- and inter-observer differences of measurements of 32 dimensions measured twice, as the opportunity arose on 50 subjects. The reliability of measurements not taken in either the USAF 1965 or Australian 1977 surveys are estimates based on the authors' judgement as to their similarity to measurements for which test/retest results are available.

- H. PARTICULARLY SENSITIVE TO: a caution that either a landmark definition and/or its location, measuring technique, or subject position requires special attention or presents special problems. (It is, of course, understood that all dimensions are sensitive to one degree or another to the above factors.) Generally, precautionary remarks are made only for those dimensions with a reproducibility rating of A, since problems with dimensions assigned reproducibility ratings of B and C are noted along with the rating.

#### DIMENSION EVALUATION SHEETS

Dimension evaluation sheets for all dimensions measured in the 14 closely reviewed surveys follow. Abbreviated descriptions of an additional 84 dimensions considered for inclusion in a new Army survey, but not measured in those surveys, appear in the Appendix.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ABDOMINAL EXTENSION ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal arc between the right and left sides of the abdomen at the level of the greatest protrusion of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Right and left hip level lines (midway between the anterior and posterior surface profile of the thigh at the level of the lateral protrusions of the greater femoral trochanters); anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD
BUREAU OF HOME ECONOMICS	<u>49.96</u>	<u>6.86</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR RATING IN C IS. of marginal value for the design and sizing of single- and lower-body garments and for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS.

- F. PARTICULARLY SENSITIVE TO: identification of the midaxillary lines; the point of respiration at which the measurement is taken; tension of the abdominal muscles.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION BREADTH, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal breadth of the torso at the level of the most protruding point of the abdomen.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>29.98</u>	<u>2.99</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.459</u>	<u>.727</u>	<u>.219</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>10.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 23.9 and 37.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: This dimension has not been identified as being useful for engineering anthropometry.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION CIRCUMFERENCE

**A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:**

1. DESCRIPTION: The horizontal circumference of the torso at the level of the greatest protrusion of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

**ALTERNATIVE DIMENSIONS:**

**B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:**

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	85.64	7.28	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army	'66	_____	_____	_____
US Army	'77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

6. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ABDOMINAL EXTENSION CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the greatest protrusion of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>91.95</u>	<u>11.96</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ABDOMINAL EXTENSION CIRCUMFERENCE OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the maximum protrusion of the abdomen of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Indeterminable- not clearly defined in the report.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>*91.80</u>	<u>11.79</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: very few Army women wear foundation garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the type of foundation garment worn; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

\*When the subject did not wear a foundation garment, the corresponding skin measurement was substituted in the data analysis.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the most protruding point of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>20.89</u>	<u>2.12</u>	4	USAF '67	<u>      </u>	<u>      </u>
2	Army Women '77	<u>      </u>	<u>      </u>	5	US Army '66	<u>      </u>	<u>      </u>
3	USN '64	<u>      </u>	<u>      </u>	6	Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:      STATURE      WEIGHT      AGE  
                               US Army '66                                      
                               US Army '77                                    

COEFFICIENT OF VARIATION: US Army '66              
   US Army '77            

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE             and         
   FEMALE             and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☐    NO ☒  
                               IN WHAT WAY?

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION DEPTH (STOMACH DEPTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the greatest protrusion of the torso below the nipples.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the torso inferior to the ilion.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>23.72</u>	<u>3.05</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAP	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF. Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION DEPTH OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the most protruding point of the abdomen of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	19.80	2.46	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY?

G. REPRODUCIBILITY A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the type of foundation garment worn; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION DEPTH, SITTING (ABDOMINAL DEPTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the most protruding point of the abdomen.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Anterior point of the abdomen of a seated subject.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>21.91</u>	<u>2.59</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.207</u>	<u>.764</u>	<u>.275</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>11.8</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 17.7 and 31.1  
FEMALE 17.7 and 31.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a required clearance dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION DEPTH, SITTING (STOMACH DEPTH, SITTING)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and most protruding point of the abdomen of a seated subject.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Anterior point of the abdomen of a seated subject.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>24.20</u>	<u>2.29</u>
RA	<u>24.67</u>	<u>2.68</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a required clearance dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most protruding point of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	93.15	4.42	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: US Army '66            STATURE            WEIGHT            AGE             
US Army '77           

COEFFICIENT OF VARIATION: US Army '66             
US Army '77           

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE            and           

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ABDOMINAL EXTENSION HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most protruding point of the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>92.13</u>	<u>4.93</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ABDOMINAL EXTENSION HEIGHT OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most protruding point of the abdomen of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the abdomen.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	92.84	4.31	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the type of foundation garment worn; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ACROMIAL HEIGHT (SHOULDER HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of the shoulder.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Acromion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>131.86</u>	<u>5.48</u>	4 USAF '67	<u>145.21</u>	<u>5.75</u>
2 Army Women '77	<u>133.48</u>	<u>6.00</u>	5 US Army '66	<u>143.72</u>	<u>6.22</u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>143.06</u>	<u>5.91</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.952</u>	<u>.502</u>	<u>.013</u>
	US Army '77	<u>.968</u>	<u>.567</u>	<u>.086</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.3</u>
	US Army '77	<u>4.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 129.3 and 158.6  
FEMALE 120.4 and 147.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required as a basic body descriptor for deriving Upper Extremity Length (Acromial Height minus Dactylion Height); required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ACROMIAL HEIGHT (SCHULTERHÖHE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of the shoulder.
2. BODY POSITION: Standing erect with maximum stretch.
3. LANDMARK(S): Acromion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>146.4</u>	<u>5.8</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required as a basic body descriptor for deriving Upper Extremity Length (Acromial Height minus Dactylion Height); required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ACROMIAL HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the tip of the shoulder.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Acromion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	61.05	2.85
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	60.44	2.70	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required for the development of a body-link system; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have longer torsos than Blacks and shorter torsos than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ACROMIAL HEIGHT, SITTING (ACROMIAL HEIGHT)  
[RA-ACROMIAL HEIGHT (2)]

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the tip of the shoulder.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Acromion.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF	_____	_____	RAA	<u>60.66</u>	<u>2.83</u>
FRG	_____	_____	RAF	<u>61.25</u>	<u>2.83</u>
RA	<u>59.17</u>	<u>3.25</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: required dimension for the design and layout of seated workspaces; required for the development of a body-link system; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS: the definition of acromion; shoulder position.

## F. PARTICULARLY SENSITIVE TO:



## ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ACROMION-BICEPS CIRCUMFERENCE LEVEL LENGTH

#### A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the tip of the shoulder and the bottom of the deltoid muscle on the side of the arm.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): Acromion; point of intersection of the deltoid muscle.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

**ALTERNATIVE DIMENSIONS:**

**B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:**

SURVEY			$\bar{X}$	SD	SURVEY			$\bar{X}$	SD
1	AF Women '68				4	USAF '67	19.01	1.50	
2	Army Women '77				5	US Army '66			
3	USN '64				6	Army Av. '70			

		STATURE	WEIGHT	AGE
C. CORRELATION WITH:	US Army '66	_____	_____	_____
	US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: was used only for the construction of Air Force manikins for guiding the design and sizing of full-body personal protective equipment, e.g., pressure suits.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY:    A ☐    B ☒    C ☐

IF B OR C, THE PROBLEM IS: location of the deltoid muscle intersection;  
particularly difficult to locate on women.

H. PARTICULARLY SENSITIVE TO: the definition of acromion.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ACROMION-RADIALE LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tip of the shoulder and the elbow parallel to the long axis of the upper arm.
2. BODY POSITION: Standing; upper extremity relaxed at side.
3. LANDMARK(S): Acromion; radiale.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>31.01</u>	<u>1.63</u>	4 USAF '67	<u>32.95</u>	<u>1.70</u>
2 Army Women '77	<u>30.85</u>	<u>1.67</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:      STATURE      WEIGHT      AGE  
                                  US Army '66                                      
                                  US Army '77                                    

COEFFICIENT OF VARIATION: US Army '66              
                                  US Army '77            

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:      MALE             and         
    FEMALE 27.3 and 35.1

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system; useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE?      YES ☐      NO ☒      GENDER SENSITIVE?      YES ☐      NO ☒  
                                  IN WHAT WAY?

G. REPRODUCIBILITY:      A ☒      B ☐      C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of acromion.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: AGE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION:

2. BODY POSITION:

3. LANDMARK(S):

4. INSTRUMENTS/EQUIPMENT:

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	23.43	6.45	4 USAF '67	30.03	6.31
2 Army Women '77	23.61	5.40	5 US Army '66	22.17	4.61
3 USN '64			6 Army Av. '70	26.21	5.50

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	-.036	.206	---
		.057	.181	---

COEFFICIENT OF VARIATION:	US Army '66	20.8
	US Army '77	22.9

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 17.4 and 43.0  
FEMALE 17.7 and 46.2

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a basic body descriptor; a primary variable required for comparing populations; required as a criterion for personnel selection; required to select microcosm populations; required in studies of body composition.

F. RACE SENSITIVE? YES ☐ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: AGE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION:

2. BODY POSITION:

3. LANDMARK(S):

4. INSTRUMENTS/EQUIPMENT:

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>31.53</u>	<u>8.17</u>	RAA	<u>28.3</u>	<u>7.6</u>
FRG	<u>25-40</u>		RAF	<u>30.76</u>	<u>6.49</u>
RA	<u>24.62</u>	<u>4.84</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a basic body descriptor; a primary variable required for comparing populations; required as a criterion for personnel selection; required to select microcosm populations; required in studies of body composition.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: AGE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION:

2. BODY POSITION:

3. LANDMARK(S):

4. INSTRUMENTS/EQUIPMENT:

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>36.33</u>	<u>12.90</u>
HES		
Men	<u>32.55</u>	<u>7.98</u>
Women	<u>32.15</u>	<u>8.12</u>
HANES		
Men	<u>31.24</u>	<u>8.10</u>
Women	<u>31.43</u>	<u>7.69</u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a basic body descriptor; a primary variable required for comparing populations; required as a criterion for personnel selection; required to select microcosm populations; required in studies of body composition.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ANKLE CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The minimum horizontal circumference of the lower leg.
2. BODY POSITION: Standing.
3. LANDMARK(S): Level of the minimum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>21.09</u>	<u>1.29</u>	4 USAF '67	<u>22.41</u>	<u>1.26</u>
2 Army Women '77	<u>20.73</u>	<u>1.25</u>	5 US Army '66	<u>22.69</u>	<u>1.44</u>
3 USN '64	<u>22.59</u>	<u>1.25</u>	6 Army Av. '70	<u>22.07</u>	<u>1.25</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.350</u>	<u>.682</u>	<u>-.035</u>
			<u>.391</u>	<u>.639</u>	<u>-.024</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>6.3</u>
	US Army '77	<u>6.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 19.7 and 26.4  
FEMALE 17.9 and 23.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the development of over-the-ankle foot gear; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ANKLE CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The minimum horizontal circumference of the lower leg.
2. BODY POSITION: Standing.
3. LANDMARK(S): Level of the minimum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>22.52</u>	<u>1.22</u>
RA	<u>22.00</u>	<u>1.17</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the development of over-the-ankle foot gear; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ANKLE CIRCUMFERENCE (MINIMUM LEG GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The minimum horizontal circumference of the lower leg.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Level of the minimum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape; sitting surface.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>21.08</u>	<u>1.75</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of over-the-ankle foot gear.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ANKLE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of the minimum circumference of the lower leg.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Level of the minimum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>11.19</u>	<u>1.35</u>	4 USAF '67	<u>13.72</u>	<u>1.15</u>
2 Army Women '77	<u>10.86</u>	<u>1.02</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.505</u>	<u>.171</u>	<u>.042</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>9.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 8.7 and 13.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of lower body garments; useful for the construction of clothing manikins; useful for the design and sizing of over-the-ankle footwear; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of locating the level of the minimum circumference of the calf.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ANTERIOR CHEST/BUST ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal arc between the mid-axillary lines passing across the greatest protrusion of the bust.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Right and left mid-axillary lines; bust level (the average height of the greatest protrusion of each breast).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>51.00</u>	<u>6.78</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken, the type and fit of bra (a bandeau was worn in this survey); identification of the mid-axillary lines.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ANTERIOR CROTCH LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front of the waist and the midpoint of the crotch.
2. BODY POSITION: Right leg straight; left leg on support surface (mid-patella height of the right leg); trunk and head erect.
3. LANDMARK(S): waist level (average height of the inferior points of the 12th ribs); mid-point of the crotch.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>36.88</u>	<u>3.89</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of Clothing manikins.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of waist level; tension of the abdominal muscles; the consistency of locating the center of the crotch; subject modesty.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ANTERIOR NECK LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the top of the neck and the top of the breast bone.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Junction of the chin with the neck column; suprasternale.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE D:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	8.43	1.68
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66 STATURE WEIGHT AGE  
US Army '77

COEFFICIENT OF VARIATION: US Army '66  
US Army '77

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: to our knowledge, this dimension has been used only for the design of full pressure suits.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: fat deposits which can make the chin/neck junction indistinct.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ANTERIOR WAIST ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal front surface distance between the sides of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Mid-axillary lines; waist level (inferior margins of 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>41.96</u>	<u>7.32</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles; consistency of establishing the mid-axillary lines.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ARM LENGTH, SHOULDER TO SCYE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the top of the shoulder and the side of the upper arm at the level of the scye.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Shoulder point (midway between the acromion and the superior point of the lateral end of the clavicle); level of the anterior scye transferred to the arm.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>13.92</u>	<u>1.73</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR RATING IN C IS: has been used only for the placement of the sleeve cap, but was not identified as being useful by clothiers for the construction of clothing manikins; not useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: the definition and location of the shoulder line and the scye landmarks.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ARM REACH FROM WALL (REICHWEITE DES ARMES)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the plane of the back and the tip of the middle finger with the subject's arm, hand, and fingers extended forward horizontally.
2. BODY POSITION: Standing erect; heels, buttocks, and shoulders against a wall; arm, hand, and fingers extended maximally in a horizontal plane.
3. LANDMARK(S): Plane of the back; dactylion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>86.3</u>	<u>4.1</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required dimension for the design and layout of seated workspaces where the body may be restrained; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the variability of the extension of the upper extremity; degree of pressure subject exerts against wall.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: AXILLA HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the axilla.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior axillary fold (anterior scye).
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>123.25</u>	<u>5.58</u>	5 US Army '66	<u>  </u>	<u>  </u>
3 USN '64	<u>  </u>	<u>  </u>	6 Army Av. '70	<u>  </u>	<u>  </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.969</u>	<u>.522</u>	<u>.056</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 4.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE    and     
FEMALE 110.7 and 136.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: compression of the axillary fold.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: AXILLA HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the axilla.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Axilla.
4. INSTRUMENTS/EQUIPMENT: FRG-anthropometer; RA, RAA; RAF- measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>132.3</u>	<u>5.4</u>	RAF	<u>133.94</u>	<u>5.50</u>
RA	<u>131.47</u>	<u>5.49</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marg.nal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: compression of the axillary fold.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: AXILLA-WAIST LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the axilla and the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Midpoint of the axilla; waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>23.09</u>	<u>2.51</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.284</u>	<u>.150</u>	<u>.085</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>10.9</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 18.1 and 30.6  
FEMALE 18.1 and 30.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of waist level; location of the scye landmarks; the consistency of locating the mid-axillary line.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: AXILLA-WAIST LENGTH (TRUNK LINE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the center of the axilla and the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Mid-point of axilla; waist level (average height of the inferior margins of the 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>19.41</u>	<u>2.31</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of waist level; the consistency of locating the mid-axillary line; the consistency of placing the tape in the axilla.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: AXILLARY ARM CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the upper arm.

2. BODY POSITION: Standing; arms slightly abducted.

3. LANDMARK(S): Anterior scye.

4. INSTRUMENTS/EQUIPMENT: Tape.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>27.44</u>	<u>2.34</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>27.63</u>	<u>2.59</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>33.00</u>	<u>2.48</u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.271</u>	<u>.850</u>	<u>.185</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>9.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 22.7 and 34.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: location of the scye landmark.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: AXILLARY ARM CIRCUMFERENCE (UPPER ARM GIRTH) (ARM CIRCUMFERENCE AT SCYE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the upper arm.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): HES, HANES- one half the distance between acromion and olecranon established with the elbow flexed 90 degrees; Bureau of Home Econ:-anterior scye level.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Location of landmarks.

ALTERNATIVE DIMENSIONS: HES, HANES- BICEPS CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>28.88</u>	<u>3.84</u>
HES		
Men	<u>30.95</u>	<u>3.12</u>
Women	<u>27.82</u>	<u>4.10</u>
HANES		
Men	<u>31.95</u>	<u>3.46</u>
Women	<u>28.91</u>	<u>4.62</u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: Bureau of Home Econ: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the development of clothing manikins; HES, HANES: marginal- used with Elbow Breadth and Skinfold: Triceps as an estimate of body composition.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: Bureau of Home Economics: the consistency of locating scye.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BACK ARC (BUTTOCK) (BACK CURVATURE-HIP)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the buttocks between the right and left sides of the hips.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Mid-axillary lines; maximum protrusion of the buttocks.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>47.49</u>	<u>3.69</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.321</u>	<u>.791</u>	<u>.245</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>7.8</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 39.6 and 57.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger buttocks than Blacks. Among men and women of like body size, men tend on the average to have smaller buttocks than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the identification of the mid-axillary lines.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: BACK ARC (BUTTOCK) (POSTERIOR HIP ARC)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the lower portion of the buttocks between the right and left sides of the hips.
2. BODY POSITION: Standing; feet together.
3. LANDMARK(S): Lateral points of the femoral greater trochanters.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>48.69</u>	<u>4.90</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: Back Arc (Buttock) (U.S. military) is the preferred dimension for the design and sizing of garments and the construction of clothing manikins since it is a measure over the greatest protrusion of the buttocks.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BACK ARC (CHEST) (BACK CURVATURE-BUST LEVEL)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the back between the right and left sides of the torso.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Mid-axillary lines; bra points (women); thelion (men).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>42.15</u>	<u>3.05</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>41.97</u>	<u>3.12</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>51.13</u>	<u>3.41</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.216</u>	<u>.749</u>	<u>.169</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>7.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 35.3 and 50.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the identification of the mid-axillary lines.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BACK ARC (WAIST) (BACK CURVATURE-WAIST LEVEL)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance across the back between the right and left sides of the torso at the level of the waist.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Mid-axillary lines; waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>35.29</u>	<u>3.52</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.199</u>	<u>.761</u>	<u>.215</u>

COEFFICIENT OF VARIATION.	US Army '66	
	US Army '77	<u>9.70</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 29.1 and 46.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of waist level; the identification of the mid-axillary lines.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BALL OF FOOT CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the ball of the foot.

2. BODY POSITION: Standing.

3. LANDMARK(S): Metatarsals I and V.

4. INSTRUMENTS/EQUIPMENT: Tape.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>24.86</u>	<u>1.23</u>
2 Army Women '77	<u>22.61</u>	<u>1.14</u>	5 US Army '66	<u>25.05</u>	<u>1.48</u>
3 USN '64			6 Army Av. '70	<u>24.51</u>	<u>1.20</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.391</u>	<u>.504</u>	<u>-.001</u>
	US Army '77	<u>.472</u>	<u>.587</u>	<u>-.027</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.9</u>
	US Army '77	<u>5.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 21.3 and 28.4  
FEMALE 20.1 and 25.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the development of lasts; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BALL OF FOOT CIRCUMFERENCE (FUSSBALLENUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the ball of the foot.
2. BODY POSITION: FRG-standing; RA, RAF-sitting.
3. LANDMARK(S): Metatarsals I and V.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Body position (feet do not support total body weight in sitting positions).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>23.9</u>	<u>1.1</u>	RAF	<u>25.01</u>	<u>1.16</u>
RA	<u>24.54</u>	<u>1.21</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful for the development of lasts; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BALL OF FOOT LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the back of the heel and the most projecting point of the inner sole of the foot.
2. BODY POSITION: Standing; feet slightly apart.
3. LANDMARK(S): Pterion; medial point of metatarsal phalangeal joint I.
4. INSTRUMENTS/EQUIPMENT: Foot box.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68			4	USAF '67	19.79	0.95
2	Army Women '77	17.85	0.98	5	US Army '66	19.64	1.05
3	USN '64			6	Army Av. '70	19.15	1.03

		STATURE	WEIGHT	AGE
C. CORRELATION WITH:	US Army '66	.607	.461	.024
	US Army '77	.629	.508	.063

COEFFICIENT OF VARIATION:	US Army '66	5.3
	US Army '77	5.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 17.2 and 22.3  
FEMALE 15.7 and 20.4

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a key dimension in the design, sizing and issuing of Army combat boots.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have shorter feet than Blacks (reflected primarily in the more elongated calcanei of Blacks). Among men and women of like body size, men tend on the average to have longer feet than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BALL OF HUMERUS HEIGHT, SITTING [RA-ACROMIAL HEIGHT (1)]

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and a point 1 cm. below the end of the shoulder to correspond with the head of the humerus.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): 1 cm. distal to acromion.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: BALL OF HUMERUS-LATERAL EPICONDYLE LENGTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	_____	_____
RA	<u>58.45</u>	<u>3.07</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: used only to approximate the level of the head of the humerus. If found to be useful for the development of a link system of the body, this dimension can be derived from Acromial Height or Acromial Height, Sitting. The alternate dimension more closely approximates the length of the humeral link.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIACROMIAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tips of the shoulders.

2. BODY POSITION: Anthropometric sitting.

3. LANDMARK(S): Acromia.

4. INSTRUMENTS/EQUIPMENT: Beam caliper.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>35.84</u>	<u>1.64</u>	4 USAF '67	<u>40.73</u>	<u>1.94</u>
2 Army Women '77	<u>35.71</u>	<u>1.61</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.387</u>	<u>.522</u>	<u>.088</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 4.50

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 32.20 and 39.60

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BIACROMIAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tips of the shoulders.
2. BODY POSITION: CF-anthropometric sitting; FRG-standing or sitting fully erect, shoulders retracted; RA, RAF-sitting erect, arms relaxed at sides, hands on mid thighs.
3. LANDMARK(S): CF-acromia (superior, lateral points); FRG, RA, RAF-acromia (lateral points).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF-landmark; FRG-shoulders retracted.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>36.92</u>	<u>2.26</u>	RAA		
FRG	<u>40.0</u>	<u>1.7</u>	RAF	<u>40.73</u>	<u>1.92</u>
RA	<u>40.78</u>	<u>2.26</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the development of load-carrying systems; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: BIACROMIAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tips of the shoulders.
2. BODY POSITION: Standing; shoulders rolled slightly forward.
3. LANDMARK(S): Acromia.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>39.98</u>	<u>2.06</u>
Women	<u>35.58</u>	<u>1.91</u>
HANES		
Men	_____	_____
Women	_____	_____

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design, sizing, procurement and issuing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of acromion; shoulder position.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIAURICULAR BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the maximum protrusion of the ears.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Lateral points of the ears.
4. INSTRUMENTS/EQUIPMENT: Spreading calipers.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: EAR PROTRUSION

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	15.83	0.95	4 USAF '67	18.83	0.81
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: US Army '66 STATURE WEIGHT AGE  
US Army '77

COEFFICIENT OF VARIATION: US Army '66  
US Army '77

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE and  
FEMALE and

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of ear and helmet clearances for ear cups.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: tissue compression.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BICEPS CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the biceps in a plane perpendicular to the long axis of the arm.
2. BODY POSITION: Standing; arms slightly abducted.
3. LANDMARK(S): Anterior point of the right biceps.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>25.61</u>	<u>2.29</u>	4	USAF '67	<u>30.79</u>	<u>2.34</u>
2	Army Women '77	<u>25.89</u>	<u>2.56</u>	5	US Army '66	<u>29.44</u>	<u>2.74</u>
3	USN '64	<u>          </u>	<u>          </u>	6	Army Av. '70	<u>30.52</u>	<u>2.71</u>

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
	US Army '66	<u>.140</u>	<u>.807</u>	<u>.226</u>
	US Army '77	<u>.236</u>	<u>.862</u>	<u>.205</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>9.3</u>
	US Army '77	<u>9.9</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 23.9 and 36.6  
FEMALE 21.0 and 33.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the construction of clothing manikins;  
useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have greater muscle mass than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BICEPS CIRCUMFERENCE, FLEXED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the flexed biceps in a plane perpendicular to the long axis of the upper arm.
2. BODY POSITION: Standing; arm horizontal; elbow flexed 90 degrees; fist tightly clenched.
3. LANDMARK(S): Anterior point of the flexed right biceps.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>26.79</u>	<u>2.32</u>	4 USAF '67	<u>32.74</u>	<u>2.26</u>
2 Army Women '77	<u>26.87</u>	<u>2.27</u>	5 US Army '66	<u>32.27</u>	<u>2.75</u>
3 USN '64	<u>32.92</u>	<u>2.42</u>	6 Army Av. '70	<u>32.09</u>	<u>2.53</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.163</u>	<u>.803</u>	<u>.208</u>
	US Army '77	<u>.207</u>	<u>.817</u>	<u>.178</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>8.5</u>
	US Army '77	<u>8.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 26.5 and 39.4  
FEMALE 21.9 and 32.8

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have greater muscle mass than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: subject motivation.

## ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL.

VARIABLE NAME: BICRISTAL BREADTH

A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside margins of the top of the pelvis (maximum pressure is used on the measuring instrument).
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Lateral points of the iliac crest.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

**ALTERNATIVE DIMENSIONS:**

**B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:**

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	_____	_____	4	USAF '67	27.92	2.04
2	Army Women '77	_____	_____	5	US Army '66	_____	_____
3	USN '64	_____	_____	6	Army Av. '70	_____	_____

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army	'66	_____	_____	_____
US Army	'77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful primarily in schemes of estimating body composition although it has been identified as being useful by some clothiers for the design and sizing of single- and lower-body garments and would, therefore, be useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have broader pelves than Blacks. Among men and women of like body size, men tend on the average to have narrower pelves than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: pressure exerted on the caliper.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BICRISTAL BREADTH (BECKENBREITE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside margins of the top of the pelvis.
2. BODY POSITION: Standing.
3. LANDMARK(S): Lateral points of the iliac crest.
4. INSTRUMENTS/EQUIPMENT: Body caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: WAIST BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>29.2</u>	<u>1.6</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful primarily in schemes of estimating body composition although it has been identified as being useful by some clothiers for the design and sizing of single- and lower-body garments and would, therefore, be useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIDELTOID BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal distance between the outside edges of the arms.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Lateral points of the deltoid muscles.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>41.87</u>	<u>2.31</u>	4 USAF '67	<u>48.24</u>	<u>2.56</u>
2 Army Women '77	<u>42.03</u>	<u>2.20</u>	5 US Army '66	<u>45.37</u>	<u>2.54</u>
3 USN '64	<u>47.70</u>	<u>2.31</u>	6 Army Av. '70	<u>47.40</u>	<u>2.56</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.325</u>	<u>.802</u>	<u>.200</u>
US Army '77	<u>.269</u>	<u>.813</u>	<u>.133</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.6</u>
	US Army '77	<u>5.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 40.0 and 52.1  
FEMALE 37.3 and 47.4

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a required clearance dimension for the design and layout of workspaces; may be used to assess aircraft accommodations; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have broader shoulders than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BIDELTOID BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal distance between the outside edges of the arms.
2. BODY POSITION: CF-sitting erect, upper arms relaxed, forearms and hands extended forward horizontally; RA, RAA, RAF-sitting erect, shoulders relaxed, elbows lightly touching sides, hands on midthighs.
3. LANDMARK(S): Lateral points of the deltoid muscles.
4. INSTRUMENTS/EQUIPMENT: CF- beam caliper; RA, RAA-measuring rig; RAF-measuring rig (1) and beam caliper (2) (Check U.S. vs. U.K. techniques).
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Arm position: RA, RAA, RAF- right deltoid lightly compressed; hands on thighs.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>47.77</u>	<u>2.75</u>	RAA	<u>46.82</u>	<u>2.48</u>		
FRG			RAF (1)	<u>46.85</u>	<u>2.08</u>	(2)	<u>46.98</u> <u>2.12</u>
RA	<u>45.82</u>	<u>2.45</u>					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a required clearance dimension for the design and layout of workspaces; may be used to assess aircraft accommodation; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIGONIAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the corners of the jaw.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Gonia.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>10.19</u>	<u>0.56</u>	4 USAF '67	<u>11.73</u>	<u>0.69</u>
2 Army Women '77	<u>11.90</u>	<u>0.85</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
US Army '77       

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have broader jaws than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating the landmarks; consistency of like pressure applied to the caliper; consistency of maintaining the tips of the caliper on the gonia.

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BIGONIAL BREADTH (UNTERKIEFERWINKELBREITE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the corners of the jaw.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Gonion.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## D. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>10.9</u>	<u>0.6</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating the landmarks; consistency of like pressure applied to the caliper; consistency of maintaining the tips of the caliper on the gonion.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIMALLEOLAR BREADTH (ANKLE BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the ankle bones.
2. BODY POSITION: Standing.
3. LANDMARK(S): Medial point of the medial malleolus; lateral point of lateral malleolus.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	_____	_____	4	USAF '67	7.33	0.38
2	Army Women '77	_____	_____	5	US Army '66	_____	_____
3	USN '64	_____	_____	6	Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the development of over-the-ankle foot gear; of no demonstrated use for the design and sizing of lower-body garments; not useful for the development of anthropomorphic analogues; also can be used as a measure of skeletal mass.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have greater skeletal mass than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO the ability to take a horizontal measurement across landmarks at different levels.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIOCULAR BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outer corners of the eyes.
2. BODY POSITION: Sitting.
3. LANDMARK(S): External canthi.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>9.67</u>	<u>0.49</u>	4 USAF '67	<u>9.17</u>	<u>0.49</u>
2 Army Women '77	<u>9.62</u>	<u>0.50</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>9.43</u>	<u>0.40</u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.083</u>	<u>.249</u>	<u>-.044</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>5.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
 FEMALE 8.5 and 10.8

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR PATING IN D IS: useful for the design of binoculars, goggles, and other eye related devices; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design, sizing, procurement and issuing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like face breadths, Whites tend on the average to have narrower spaced eyes than Blacks and Asians. Among men and women of like face breadths, men tend on the average to have broader spaced eyes than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: not a contact measurement; consistency of identifying the landmarks; subject's and anthropometrist's apprehension of measurements taken close to the eye.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BISPINOUS BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the front points of the pelvis.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Anterior superior iliac spines.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>23.27</u>	<u>2.20</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.377</u>	<u>.579</u>	<u>.286</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 9.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE and  
FEMALE 18.3 and 29.7

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have broader pelvis than Blacks. Among men and women of like body size, men tend on the average to have narrower pelvis than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of the landmarks.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tragus of each ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>12.89</u>	<u>0.50</u>	4 USAF '67	<u>14.25</u>	<u>0.56</u>
2 Army Women '77	<u>12.98</u>	<u>0.53</u>	5 US Army '66	<u>13.50</u>	<u>0.56</u>
3 USN '64	<u>13.99</u>	<u>0.52</u>	6 Army Av. '70	<u>14.17</u>	<u>0.57</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.176</u>	<u>.485</u>	<u>.179</u>
	US Army '77	<u>.200</u>	<u>.354</u>	<u>.224</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.2</u>
	US Army '77	<u>4.1</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>12.2</u>	and	<u>14.9</u>
	FEMALE	<u>11.6</u>	and	<u>14.2</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of equipment worn on the head; useful as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design and sizing of equipment worn on the head.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Asian males of like body size, Whites tend on the average to have narrower heads than Asians. Among men and women of like body size, men tend on the average to have broader heads than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: tissue compression.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-CORONAL ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance over the top of the head between the tragus of each ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>33.92</u>	<u>1.40</u>	4 USAF '67	<u>35.76</u>	<u>1.26</u>
2 Army Women '77	<u>33.22</u>	<u>1.27</u>	5 US Army '66	<u>35.50</u>	<u>1.22</u>
3 USN '64	<u>35.51</u>	<u>1.32</u>	6 Army Av. '70	<u>35.50</u>	<u>1.22</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.300</u>	<u>.381</u>	<u>.021</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 3.80

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 30.50 and 36.40  
FEMALE 30.50 and 36.40

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for guiding the design of personal equipment such as ear cups that are mounted on a flexible band; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to be larger than women for this dimension.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-CORONAL ARC [TRANSVERSALER KOPFBOGEN (CORONALBOGEN)]

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance over the top of the head between the tragus of each ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>35.41</u>	<u>1.36</u>	RAA	<u>35.43</u>	<u>1.26</u>
FRG	<u>35.0</u>	<u>1.3</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: useful for guiding the design of personal equipment such as ear cups that are mounted on a flexible band; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRACION-MENTON ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the tragus of each ear with the tape passing over the tip of the chin.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia; menton.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>32.65</u>	<u>1.24</u>
2 Army Women '77	<u>29.36</u>	<u>1.31</u>	5 US Army '66		
3 USN '64	<u>32.21</u>	<u>1.27</u>	6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.312</u>	<u>.480</u>	<u>.053</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE          and           
FEMALE 26.3 and 32.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to be smaller for this dimension than Blacks. Among men and women of like body size, men tend on the average to have larger faces than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia.

## H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-MINIMUM FRONTAL ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the tragus of each ear with the tape passing across the forehead.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia; frontotemporales.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	30.81	1.00
2 Army Women '77	28.40	1.03	5 US Army '66		
3 USN '64	30.21	1.09	6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.400	.440	.056

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	3.60

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 26.00 and 31.00

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger faces than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-POSTERIOR ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the tragus of each ear with the tape passing over the lower part of the back of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragion; USN '64-nuchale; USAF '67-inion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: different posterior landmarks.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	29.45	1.49
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	31.44	2.10	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: there is no demonstrated use for this dimension

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: nuchale is an ill-defined landmark; inion is often difficult to locate precisely on many subjects.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-SUBMANDIBULAR ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The diagonal surface distance between the tragus of each ear with the tape passing over the juncture of the chin and neck.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia; chin/neck juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	30.98	1.58
2 Army Women '77	26.49	1.34	5 US Army '66		
3 USN '64	31.22	1.41	6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.252	.507	.222

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 5.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 23.5 and 29.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger faces than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia; chin-neck juncture may be indistinct on heavier subjects.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BITRAGION-SUBNASALE ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the tragus of each ear with the tape passing over the juncture of the nose and the groove of the upper lip.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragia; philtrum/nasal septum juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	29.31	1.02
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	28.68	1.06	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
US Army '77                     

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have a lesser value for this dimension than Blacks. Among men and women of like body size, men tend on the average to have a greater value for this dimension than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the tape on the tragia.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BIZYGOMATIC BREADTH (FACE BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the upper face.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Zygia.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>12.90</u>	<u>0.58</u>	4 USAF '67	<u>14.23</u>	<u>0.52</u>
2 Army Women '77	<u>13.20</u>	<u>0.53</u>	5 US Army '66	<u>13.99</u>	<u>0.56</u>
3 USN '64	<u>13.62</u>	<u>0.70</u>	6 Army Av. '70	<u>13.87</u>	<u>0.53</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.186</u>	<u>.531</u>	<u>.190</u>
	US Army '77	<u>.226</u>	<u>.468</u>	<u>.194</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.0</u>
	US Army '77	<u>4.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>12.7</u>	and	<u>15.4</u>
	FEMALE	<u>11.9</u>	and	<u>14.6</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- E. REASON FOR RATING IN D IS: a key dimension in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design, sizing, procurement and issuing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.
- F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Asian males of like body size, Whites tend on the average to have narrower faces than Asians. Among men and women of like body size, men tend on the average to have broader faces than women.

## G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BIZYGOMATIC BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the upper face.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Zygia.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF	<u>14.12</u>	<u>0.53</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>14.3</u>	<u>0.5</u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design, sizing, procurement and issuing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: BUST CIRCUMFERENCE OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the chest over a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Indeterminate-not clearly defined in the report.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>*90.55</u>	<u>9.93</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: very few Army women wear foundation garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the type of foundation garment worn; the point of respiration at which the measurement is taken.

\*See Abdominal Extension Circumference Over Foundation Garment - U.S. Civilians.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUST DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT.

1. DESCRIPTION: The horizontal distance between the back and the chest at the level of the bust.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior bustpoint.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>23.64</u>	<u>1.93</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>22.91</u>	<u>2.21</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	5 Army Av. '70	<u>          </u>	<u>          </u>

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.164</u>	<u>.739</u>	<u>.238</u>

COEFFICIENT OF VARIATION: US Army '66	<u>          </u>
US Army '77	<u>9.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 18.7 and 29.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a body clearance dimension required for the design and layout of workspaces; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; type and fit of bra worn.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUSTPOINT HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most protruding point of the bra pocket.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of the bra.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CHEST HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>118.32</u>	<u>5.21</u>	4 USAF '67	<u>        </u>	<u>        </u>
2 Army Women '77	<u>118.29</u>	<u>5.63</u>	5 US Army '66	<u>        </u>	<u>        </u>
3 USN '64	<u>        </u>	<u>        </u>	6 Army Av. '70	<u>        </u>	<u>        </u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>        </u>	<u>        </u>	<u>        </u>
US Army '77	<u>.937</u>	<u>.463</u>	<u>.049</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>        </u>
	US Army '77	<u>4.8</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE          and           
FEMALE 106.0 and 131.5

## D. THOUGHT TO BE OF Essential, Useful, Marg'nal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments for women; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the type and fit of the bra worn; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVLVS OF U.S. CIVILIANS

VARIABLE NAME: BUSTPOINT HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the maximum protrusion of the breasts.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior points of the bandeau.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>114.43</u>	<u>5.87</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the type and fit of bra; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUSTPOINT-BUSTPOINT BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the most protruding point of each bra pocket.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior point of each bra pocket.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	18.53	1.55	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: 

US Army '66	
US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE		and	
FEMALE		and	

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the type and fit of the bra worn.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK CIRCUMFERENCE (HIP CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the maximum protrusion of the buttocks.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Posterior buttock point.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USAF '68-measured at 7" and 9" below waist.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68*			4 USAF '67	98.62	5.51
2 Army Women '77	95.49	6.30	5 US Army '66	94.21	6.25
3 USN '64	98.03	5.08	6 Army Av. '70	97.78	6.47

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		.350	.919	.217
	US Army '77	.414	.903	.208

COEFFICIENT OF VARIATION:	US Army '66	6.6
	US Army '77	6.7

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	82.0	and	112.1
	FEMALE	81.6	and	111.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a potential key dimension for the design, sizing, procurement and issuing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger hips than Blacks. Among men and women of like body size, men tend on the average to have smaller hips than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

\*SEE HIP CIRCUMFERENCE 7" AND 9" BELOW WAIST

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the maximum protrusion of the buttocks.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Level of the maximum protrusion of the buttocks.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>98.90</u>	<u>6.54</u>	RAA	<u>96.90</u>	<u>6.10</u>
FRG	<u>98.6</u>	<u>5.2</u>	RAF	<u>98.93</u>	<u>5.01</u>
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a potential key dimension required for the design, sizing, procurement and issuing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK CIRCUMFERENCE, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the buttocks of a seated subject with the tape passing just under the buttocks/seat juncture and across the lap at the torso/thigh juncture.
2. BODY POSITION: Sitting erect.
3. LANDMARK(S): Buttock/seat juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	100.00	6.09	4 USAF '67	107.64	6.74
2 Army Women '77	98.10	6.83	5 US Army '66		
3 USN '64	106.45	5.83	6 Army Av. '70		

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66			
US Army '77	.469	.918	.279

COEFFICIENT OF VARIATION: US Army '66	
US Army '77	7.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 85.1 and 115.9  
FEMALE 85.1 and 115.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger buttocks than Blacks. Among men and women of like body size, men tend on the average to have smaller buttocks than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK CIRCUMFERENCE, SITTING, OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of a seated subject wearing a foundation garment with the tape passing just under the buttocks/seat juncture and across the lap at the torso/thigh juncture.
2. BODY POSITION: Sitting erect.
3. LANDMARK(S): Buttock/seat juncture; torso/thigh juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	99.62	6.10	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger buttocks than Blacks.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the maximum protrusion of the buttocks and the front of the torso.
2. BODY POSITION: Anthropometric standing (head not necessarily in the Frankfort plane).
3. LANDMARK(S): Posterior point of the buttocks.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>21.15</u>	<u>1.79</u>	4 USAF '67	<u>23.97</u>	<u>2.05</u>
2 Army Women '77	<u>24.15</u>	<u>1.87</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>24.15</u>	<u>1.87</u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:      STATURE      WEIGHT      AGE  
                                  US Army '66                                      
                                  US Army '77                                    

COEFFICIENT OF VARIATION: US Army '66              
                                  US Army '77            

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE             and         
    FEMALE             and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; a useful dimension for the design and layout of seated workspaces.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☒    NO ☐  
                                  IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller buttocks than women.

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK DEPTH OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the maximum protrusion of the buttocks and the front of a torso of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Posterior point of the buttocks.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	21.59	1.97	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

I. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the point of the maximum protrusion of the buttocks.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Posterior point of the buttocks.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>82.21</u>	<u>4.16</u>	4 USAF '67	<u>90.11</u>	<u>4.39</u>
2 Army Women '77	<u>83.79</u>	<u>4.67</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.829</u>	<u>.486</u>	<u>.026</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>      </u>
	US Army '77	<u>5.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 74.0 and 95.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to be less than Blacks and greater than Asians for this dimension.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK-KNEE LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the most forward point of the knee.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Posterior buttock point; anterior knee point.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>57.43</u>	<u>2.63</u>	4 USAF '67	<u>60.40</u>	<u>2.70</u>
2 Army Women '77	<u>57.85</u>	<u>3.06</u>	5 US Army '66	<u>59.47</u>	<u>2.85</u>
3 USN '64	<u>61.20</u>	<u>2.54</u>	6 Army Av. '70	<u>60.19</u>	<u>2.62</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.792</u>	<u>.613</u>	<u>.053</u>
US Army '77	<u>.761</u>	<u>.720</u>	<u>.118</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.8</u>
	US Army '77	<u>5.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 52.9 and 66.5  
FEMALE 51.1 and 65.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a primary body clearance dimension required for the design and layout of seated workspaces; a measurement of cockpit accommodation; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: compression of buttock tissue; buttocks with a smooth curvature may often have an ill-defined posterior point.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK-KNEE LENGTH (GESÄSS-KNIE-LÄNGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the most forward point of the knee.
2. BODY POSITION: RA, RAA, RAF-Anthropometric sitting; FRG-sitting erect, calves and feet hanging freely.
3. LANDMARK(S): RA, RAA, RAF-back plane<sup>1</sup>, posterior buttock point<sup>2</sup>, anterior knee point; FRG-posterior buttock point.
4. INSTRUMENTS/EQUIPMENT: RA, RAA-measuring rig; RAF-measuring rig<sup>1</sup> and anthropometer<sup>2</sup> (check of U.S. vs. U.K. techniques); FRG-anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD	$\bar{X}$	SD
CF			RAA	59.83	2.52		
FRG	59.9	2.5	RAF	60.76	2.69	60.73	2.61
RA	59.93	3.13					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: a primary body clearance dimension required for the design and layout of seated workspaces; a measurement of cockpit accommodation; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: compression of buttock tissue; buttocks with a smooth contour may often have an ill-defined posterior point.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: BUTTOCK-KNEE LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the most forward point of the knee.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Posterior buttock point; anterior knee point.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>59.40</u>	<u>2.90</u>
Women	<u>56.94</u>	<u>3.09</u>
HANES		
Men	_____	_____
Women	_____	_____

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR RATING IN C IS: a primary body clearance dimension required for the design and layout of seated workspaces; a measurement of cockpit accommodation; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: compression of buttock tissue; buttocks with a smooth contour may often have an ill-defined posterior point.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK-POPLITEAL LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the back of the knee of a seated subject.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Posterior point of the buttock; tendon of the biceps femoris.
4. INSTRUMENTS/EQUIPMENT: USN '64, USA '66-beam caliper; USAF '67, USAF '68, USA '70-sitting-surface mounted scale, block.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>47.71</u>	<u>2.76</u>	4 USAF '67	<u>50.37</u>	<u>2.58</u>
2 Army Women '77	<u>50.26</u>	<u>1.51</u>	5 US Army '66	<u>49.82</u>	<u>2.50</u>
3 USN '64	<u>50.26</u>	<u>1.51</u>	6 Army Av. '70	<u>49.08</u>	<u>2.59</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.681</u>	<u>.455</u>	<u>.026</u>
US Army '77	<u>      </u>	<u>      </u>	<u>      </u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>5.0</u>	<u>      </u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>44.0</u>	and	<u>55.8</u>
	FEMALE	<u>      </u>	and	<u>      </u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a required dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of 1 body size, Whites tend on the average to have shorter legs than Blacks and longer legs than Asians.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the degree of compression of a buttock; the degree of contact with the tendon of the biceps femoris muscle; buttocks with a smooth contour often may have an ill-defined posterior point.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: BUTTOCK-POPLITEAL LENGTH (SITZTIEFE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the back of the knee of a seated subject.
2. BODY POSITION: CF- Anthropometric sitting; FRG- sitting erect, thighs completely supported, feet unsupported.
3. LANDMARK(S): Posterior point of a buttock; the tendon of the biceps femoris.
4. INSTRUMENTS/EQUIPMENT: CF-scale on sitting surface, block; FRG- anthropometer, right triangle.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>49.98</u>	<u>2.47</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>50.9</u>	<u>4.1</u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a required dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the degree of compression of the buttock; the degree of contact with the tendon of the biceps femoris muscle; buttocks with a smooth contour may often have an ill-defined posterior point.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: BUTTOCK-POPLITEAL LENGTH

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The horizontal distance between the rear-most point of a buttock and the back of the knee of a seated subject.
2. BODY POSITION: Anthropometric sitting erect.
3. LANDMARK(S): Posterior point of a buttock; tendon of the biceps femoris.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>49.54</u>	<u>3.07</u>
Women	<u>47.99</u>	<u>3.08</u>
HANES		
Men	_____	_____
Women	_____	_____

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: required dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: degree of contact of the popliteal fossa with the edge of the sitting surface; degree of contact of the beam caliper with the buttock; buttocks with a smooth contour may often have an ill-defined posterior point.

## F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CALF CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the calf.
2. BODY POSITION: Standing; feet parted a few centimeters.
3. LANDMARK(S): Level of the maximum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	S	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>34.14</u>	<u>2.25</u>	4 USAF '67	<u>37.19</u>	<u>2.27</u>
2 Army Women '77	<u>35.08</u>	<u>2.49</u>	5 US Army '66	<u>36.60</u>	<u>2.67</u>
3 USN '64	<u>37.49</u>	<u>2.21</u>	6 Army Av. '70	<u>37.29</u>	<u>2.40</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.279</u>	<u>.796</u>	<u>.064</u>
US Army '77	<u>.304</u>	<u>.777</u>	<u>.028</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>7.3</u>
	US Army '77	<u>7.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>30.9</u>	and	<u>43.4</u>
	FEMALE	<u>29.8</u>	and	<u>41.2</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the design of leg restraint systems; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller calves than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the location of the level of the maximum circumference of the calf (on some subjects this level can be indistinct over a vertical distance of about 2 cm).

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CALF CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the calf.
2. BODY POSITION: Standing, feet parted a few centimeters.
3. LANDMARK(S): Level of the maximum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>36.66</u>	<u>2.15</u>
RA	<u>36.46</u>	<u>2.53</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the design of leg restraint systems; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the location of the level of the maximum circumference of the calf (on some subjects this level can be indistinct over a vertical distance of about 2 cm).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CALF CIRCUMFERENCE (MAXIMUM CALF GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the calf.
2. BODY POSITION: Standing, feet parted a few centimeters.
3. LANDMARK(S): Level of the maximum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>34.16</u>	<u>3.05</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the design of leg restraint systems; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the location of the level of the maximum circumference of the calf (on some subjects this level can be indistinct over a vertical distance of about 2 cm).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CALF HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the standing surface to the level of the maximum circumference of the calf.
2. BODY POSITION: Standing.
3. LANDMARK(.): Level of the maximum circumference of the calf.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	35.55	2.22
2 Army Women '77	32.55	2.30	5 US Army '66	35.42	2.70
3 USN '64			6 Army Av. '70	34.45	2.18

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE	CROTCH HT.
	US Army '77	.597	.268	.007	.595
		.728	.416	.031	.843

COEFFICIENT OF VARIATION:	US Army '66	7.6
	US Army '77	7.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	29.3	and	41.9
	FEMALE	27.8	and	38.3

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the design and sizing of high-top boots; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the location of the level of the maximum circumference of the calf (on some subjects this level can be indistinct over a vertical distance of about 2 cm).

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CERVICALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the back of the base of the neck.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>139.20</u>	<u>5.52</u>	4 USAF '67	<u>152.06</u>	<u>5.82</u>
2 Army Women '77	<u>140.28</u>	<u>6.02</u>	5 US Army '66	<u>149.56</u>	<u>6.34</u>
3 USN '64	<u>151.17</u>	<u>5.54</u>	6 Army Av. '70	<u>149.65</u>	<u>5.96</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.943</u>	<u>.504</u>	<u>.008</u>
	US Army '77	<u>.979</u>	<u>.563</u>	<u>.192</u>

COEFFICIENT OF VARIATION:	US Army '66	
		<u>4.2</u>
	US Army '77	<u>4.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 134.4 and 164.1  
FEMALE 126.9 and 156.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: identification of cervicale (it is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CERVICALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the back of the base of the neck.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>149.29</u>	<u>5.90</u>	RAA		
FRG			RAF	<u>151.72</u>	<u>5.82</u>
RA	<u>147.87</u>	<u>5.88</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: identification of cervicale (it is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CERVICALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the back of the base of the neck.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>137.97</u>	<u>5.84</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: identification of cervicale (it is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CERVICALE HEIGHT, SITTING (HÖHE DES CERVICALE IM SITZEN)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the base of the back of the neck.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Cervicale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>66.4</u>	<u>2.7</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: identification of the landmark (cervicale is difficult to locate precisely on many subjects).



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CERVICALE HEIGHT, SITTING [SITTING HEIGHT (SIC)]

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the base of the back of the neck.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Cervicale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>62.48</u>	<u>3.02</u>
HES		
Men	<u>        </u>	<u>        </u>
Women	<u>        </u>	<u>        </u>
HANES		
Men	<u>        </u>	<u>        </u>
Women	<u>        </u>	<u>        </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: required for the development of a body-link system; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: identification of the landmark (cervicale is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CERVICALE-ANTERIOR WAIST LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the base of the back of the neck and the center of the front of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale; origin of shoulder line [a line corresponding to the shoulder seam that originates at the lateral base of the neck (the circumference passing across cervicale and each clavicle) at the border of the trapezius, is directed towards acromion, and terminates at its intersection with the scye at the shoulder]; waist level (average height of the inferior points of the 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>48.51</u>	<u>2.79</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: of little demonstrated use for the design and sizing of single- and upper-body garments, clothing manikins, and for the development of load-carrying systems.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of waist level and location of cervicale (cervicale is difficult to locate precisely on many subjects); the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal breadth of the chest at the level of the nipples or bust points.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Thelion/bustpoint.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>27.99</u>	<u>1.91</u>	4 USAF '67	<u>32.78</u>	<u>2.12</u>
2 Army Women '77	<u>28.24</u>	<u>1.82</u>	5 US Army '66	<u>30.57</u>	<u>2.15</u>
3 USN '64	<u>32.73</u>	<u>2.07</u>	6 Army Av. '70	<u>34.40</u>	<u>2.39</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.290</u>	<u>.757</u>	<u>.207</u>
US Army '77	<u>.269</u>	<u>.776</u>	<u>.168</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>7.0</u>
	US Army '77	<u>6.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 26.1 and 36.4  
FEMALE 24.5 and 33.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the inclusion of the rib cage only or the rib cage and the latissimus dorsi in particularly well-muscled individuals.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST/BUST CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the torso at the level of the nipples or at the level of the maximum protrusion of the breasts.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Thelion/bustpoint.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>89.73</u>	<u>5.70</u>	4 USAF '67	<u>98.55</u>	<u>6.35</u>
2 Army Women '77	<u>88.18</u>	<u>6.33</u>	5 US Army '66	<u>93.77</u>	<u>6.69</u>
3 USN '64	<u>98.85</u>	<u>5.78</u>	6 Army Av. '70	<u>98.44</u>	<u>6.87</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.245</u>	<u>.849</u>	<u>.275</u>
			<u>.239</u>	<u>.808</u>	<u>.213</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>7.1</u>	<u>7.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 80.9 and 112.8  
FEMALE 76.1 and 105.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of single- and upper-body garments; required for the construction of clothing manikins; required for the development of load-carrying systems; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; the type and fit of bra.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CHEST/BUST CIRCUMFERENCE (BRUSTUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the nipples.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Thelion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF, RA, RAF-measurement taken at midpoint of normal respiration; FRG-average of measurements of full inhalation and full exhalation; RAA-measurement taken at the end point of normal inhalation.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	98.84	7.83	RAA	97.36	7.05
FRG	*99.9	5.7	RAF	97.17	5.70
RA	95.85	6.42			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of single- and upper-body garments; required for the construction of clothing manikins; required for the development of load-carrying systems; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken.

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\*The data are not consistent with the reported measurement technique.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CHEST/BUST CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the chest at the level of the maximum protrusion of the breasts or level of the nipples.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Thelion/bustpoints.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>90.47</u>	<u>9.83</u>
HES		
Men	<u>99.62</u>	<u>8.33</u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of single- and upper-body garments; required for the construction of clothing manikins; required for the development of load-carrying systems; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; the type and fit of bra.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST CIRCUMFERENCE AT SCYE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso measured at the level of the front armscye.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior scye.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	84.25	4.96	4 USAF '67	102.26	6.07
2 Army Women '77	85.52	5.11	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.286	.825	.199

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77
	6.0

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 75.2 and 99.3  
FEMALE 75.2 and 99.3

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a potential key dimension for the design, sizing, procurement and issuing of single- and upper-body garments (particularly for unisex items); required for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Breast tissue may affect this dimension.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; the definition and location of scye; the type and fit of bra.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CHEST CIRCUMFERENCE AT SCYE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the front armscye.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Right and left anterior scye.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Bureau of Home Economics- subjects wore a bandeau; HES-subjects were bare breasted; Bureau of Home Economics-measured at midpoint of respiration; HES-measured during "normal" breathing.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>88.32</u>	<u>8.13</u>
HES		
Men		
Women	<u>98.95</u>	<u>9.18</u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a potential key dimension for the design, sizing, procurement and issuing of single- and upper-body garments (particularly for unisex items); required for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; the definition and location of scye; the type and fit of bra.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST CIRCUMFERENCE BELOW BUST

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso below the bust.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Bust/torso juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	74.33	4.87	4 USAF '67		
2 Army Women '77	74.80	4.94	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.276	.801	.196

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE          and           
FEMALE 67.4 and 89.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken, the consistency of establishing the measurement level; the type and fit of bra.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CHEST CIRCUMFERENCE, EXPIRED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the chest with the breath fully expired.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): 4th intercostal space.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	_____	_____
Women	_____	_____
HANES		
Men	<u>92.53</u>	<u>8.15</u>
Women	<u>80.87</u>	<u>8.88</u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: there is no engineering anthropometry application for this dimension.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of landmark location; the subject's ability to exhale fully.

F. PARTICULARLY SENSITIVE TO: subject cooperation.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the chest at the level of the nipples.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Thelion.
4. INSTRUMENTS/EQUIPMENT:
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>          </u>	<u>          </u>	4 USAF '67	<u>24.52</u>	<u>1.93</u>
2 Army Women '77	<u>          </u>	<u>          </u>	5 US Army '66	<u>23.18</u>	<u>1.99</u>
3 USN '64	<u>23.58</u>	<u>1.79</u>	6 Army Av. '70	<u>24.05</u>	<u>2.25</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.215</u>	<u>.750</u>	<u>.339</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>8.6</u>
	US Army '77	<u>          </u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 19.2 and 28.8  
FEMALE            and           

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a body clearance dimension required for the design and layout of workspaces; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CHEST DEPTH (BRUSTKORBTIEFE) (SAGITTALER BRUSTDURCHMESSER)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back and the chest at the level of the nipples.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): RAA-thelion; FRG-mesosternum at the level of thelion.
4. INSTRUMENTS/EQUIPMENT: FRG-body caliper; RAA-beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-spine-mesosternum depth; RAA-end of respiration.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF			RAA	<u>24.25</u>	<u>2.24</u>
FRG	<u>22.6</u>	<u>2.0</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a body clearance dimension required for the design and layout of workspaces; required for the development of anthropomorphic analogues. RAA-useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems; FRG-useful only in studies of human biology.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CHEST DEPTH, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the plane of the back and the chest at the level of the nipples of a seated subject.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Thelion.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CHEST DEPTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	_____	_____
RA	<u>26.13</u>	<u>1.13</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHEST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the nipple.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): The nipple.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '60	_____	_____	4 USAF '67	129.24	5.24
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	129.76	5.14	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
 US Army '77                            

COEFFICIENT OF VARIATION: US Army '66         
 US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
 FEMALE        and       

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CHIN PROMINENCE-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the most forward point on the chin and the plane of the back of the head.
2. BODY POSITION: Standing, head in the Frankfort plane.
3. LANDMARK(S): Anterior tip of the chin; back plane of head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: MENTON-WALL

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>18.23</u>	<u>1.14</u>	4 USAF '67	<u>20.47</u>	<u>1.05</u>
2 Army women '77	<u>19.47</u>	<u>1.10</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.192</u>	<u>.340</u>	<u>.039</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>5.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 17.2 and 22.4

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CROTCH HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the crotch.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Crotch.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USAF '66, USAF '67, USAF '68, USA '70, USA '77-light contact; USN '64-firm pressure.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>74.50</u>	<u>4.03</u>	4 USAF '67	<u>85.07</u>	<u>4.15</u>
2 Army Women '77	<u>76.37</u>	<u>4.38</u>	5 US Army '66	<u>83.94</u>	<u>4.67</u>
3 USN '64	<u>84.35</u>	<u>4.12</u>	6 Army Av. '70	<u>81.92</u>	<u>4.44</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.819</u>	<u>.236</u>	<u>-.103</u>
US Army '77	<u>.861</u>	<u>.402</u>	<u>-.018</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>5.6</u>	<u>5.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 72.8 and 95.1  
FEMALE 66.8 and 86.8

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter legs than Blacks and longer legs than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the degree of pressure of the measuring instrument on the crotch; type of body covering worn (USAF '67-nude; all others-jockey type or boxer shorts worn by men, panties worn by women).



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CROTCH HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the crotch.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Crotch.
4. INSTRUMENTS/EQUIPMENT: CF, FRG-anthropometer; RA, RAA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF-light instrument contact; FRG-maximum instrument contact; RA, RAA, RAF-firm instrument contact.

ALTEPNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	79.57	4.41	RAA	81.26	4.10
FRG	81.7	4.2	RAF	85.35	4.30
RA	81.21	4.21			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension required for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the degree of pressure of the measuring instrument on the crotch; type of body covering worn (CF, RA, RAA, RAF-briefs; FRG- gym shorts).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CROTCH HEIGHT [sic] (GLUTEAL FURROW HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the lowest point of a crease at the buttock/leg juncture.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Crotch center.\*
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CROTCH HEIGHT

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>72.47</u>	<u>4.42</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: Crotch Height is a key dimension for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the degree of pressure of the measuring instrument on the crotch.

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\*The description of the center landmark in the report is not clear. Evidence strongly indicates that this dimension is actually Gluteal Furrow Height.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: CROTCH LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the front of the waist, through the crotch, over the maximum protrusion of a buttock, and back to the waist above the buttock.
2. BODY POSITION: Anthropometric Standing.
3. LANDMARK(S): Anterior waist; crotch; posterior buttock point; posterior waist vertical to posterior buttock point (waist level-USA '77-preferred; USAF '67-omphalion).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	70.61	4.43
2 Army Women '77	72.92	5.45	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.424	.636	.043

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 58.1 and 85.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend on the average to have larger buttocks than Blacks. Among men and women of like body size, men tend on the average to be smaller for this dimension than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles; the tension on the tape.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: CROTCH LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front of the waist and the back of the waist with the measuring tape passing through the crotch.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level: <sup>1</sup>preferred waist level; <sup>2</sup>natural indentation.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CROTCH LENGTH (see U.S. military and civilians)

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD	<u>SURVEY</u>	$\bar{X}^1$	SD <sup>1</sup>	$\bar{X}^2$	SD <sup>2</sup>
CF	_____	_____	RAA	_____	_____	_____	_____
FRG	_____	_____	RAF	<u>64.13</u>	<u>5.32</u>	<u>73.47</u>	<u>4.56</u>
RA	_____	_____					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: Crotch length as measured by the U.S. military yields more useful data for the design and sizing of single- and lower-body garments and for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles; tension on the tape.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: CROTCH LENGTH (TOTAL CROTCH LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front and back of the waist through the crotch.
2. BODY POSITION: Right leg straight, left leg on support surface (mid-patella height of right leg).
3. LANDMARK(S): Waist level (the average height of the inferior margins of the 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Tape.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>75.34</u>	<u>6.27</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles; the tension of the tape.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: DACTYLION HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of the middle finger.
2. BODY POSITION: Standing erect; shoulders relaxed; arm, hand and fingers fully extended.
3. LANDMARK(S): Dactylion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	67.18	3.51
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66            STATURE            WEIGHT            AGE             
US Army '77                                            

COEFFICIENT OF VARIATION: US Army '66             
US Army '77           

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE            and           

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required in conjunction with Acromial Height to derive Upper Extremity Length (Acromion Height minus Dactylion Height) which is a basic body descriptor for assessing body proportions. This dimension is of undemonstrated value alone.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter arms than Blacks and longer arms than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: shoulder and upper extremity position.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: DACTYLION HEIGHT (FINGERTIP HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of the middle finger.
2. BODY POSITION: Standing erect; shoulders relaxed; arm, hand, and fingers fully extended.
3. LANDMARK(S): Dactylion.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>67.01</u>	<u>3.44</u>
RA	_____	_____			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: required in conjunction with Acromial Height for deriving Upper Extremity Length (Acromion Height minus Dactylion Height) which is a basic body descriptor for assessing body proportions. This dimension is of undemonstrated value alone.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: shoulder and upper extremity position.

## ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL.

VARIABLE NAME: DELTOID ARC

**A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:**

1. DESCRIPTION: The vertical surface distance between the tip of the shoulder and the insertion of the deltoid muscle on the outside of the upper arm.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): Acromion; point of insertion of the deltoid muscle.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

**ALTERNATIVE DIMENSIONS:**

**8. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:**

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	15.91	1.33
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army	'66			
US Army	'77			

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: used only by the USAF for the development of eight-size height/weight manikins used to guide the design and sizing of pressure suits.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of insertion of the deltoid muscle is often difficult to locate, particularly on women; the definition of acromion.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: EAR BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Otobasion superius; postaurale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	2.98	0.33	4 USAF '67	3.80	0.30
2 Army Women '77	3.72	0.33	5 US Army '66		
3 USN '64	3.57	0.33	6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
US Army '66 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_  
\* US Army '77 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 8.9

5th and 95th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 3.2 and 4.3

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design of ear cups.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the compression of the ear tissue.

H. PARTICULARLY SENSITIVE TO:

\*n = 37

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: EAR BREADTH (OHRBREITE)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The maximum horizontal breadth of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Anterior ear point; posterior ear point.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>3.6</u>	<u>0.3</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design of ear cups.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the distortion of the fleshy tissue of the ear.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: EAR LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the top and the bottom of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Supraaurale; subaurale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>5.24</u>	<u>0.44</u>	4 USAF '67	<u>6.60</u>	<u>0.43</u>
2 AF Women '77	<u>5.80</u>	<u>0.38</u>	5 US Army '66	<u>        </u>	<u>        </u>
3 USN '64	<u>6.53</u>	<u>0.40</u>	6 Army Av. '70	<u>        </u>	<u>        </u>

C. CORRELATION WITH: US Army '66          STATURE          WEIGHT          AGE           
 \*US Army '77         

COEFFICIENT OF VARIATION: US Army '66           
 US Army '77 6.6

5th and 95th US ARMY '66 and '77 PERCENTILE VALUES: MALE          and           
 FEMALE 5.2 and 6.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design of ear cups.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have longer ears than Blacks. Among men and women of like body size, men tend on the average to have longer ears than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: compression of the ear tissue

\*n = 37

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: EAR LENGTH (OHRLÄNGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the top and the bottom of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Supraaurale; subaurale.
4. INSTRUMENTS/ELEMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCE: NONE      MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>6.5</u>	<u>0.4</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design of ear cups.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: compression of the ear tissue.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: EAR LENGTH ABOVE TRAGION

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the tragus and the top of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Tragion; superaurale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	2.94	0.29
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: compression of ear tissue; positioning caliper precisely on tragion.

H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: EAR PROTRUSION

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the head and the point of greatest protrusion of the ear.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Lateral point of the ear.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: BIAURICULAR BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	2.16	0.34
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

US Army '66	STATURE	WEIGHT	AGE
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design of ear cups (no data available for women); useful as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design, sizing, procurement and issuing of equipment worn on the head.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

C. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: compression of the ear tissue; difficulty of properly placing caliper blades.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ECTOCANTHUS-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the outer corner of the eye and the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Ectocanthus; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>11.76</u>	<u>0.92</u>	4 USAF '67	<u>11.95</u>	<u>0.77</u>
2 Army Women '77	<u>11.13</u>	<u>0.80</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.177</u>	<u>.208</u>	<u>.047</u>

COEFFICIENT OF VARIATION: US Army '66             
US Army '77 7.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 9.2 and 12.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; placement of instrument close to but not touching ectocanthus.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ECTOCANTHUS-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outer corner of the eye and the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Ectocanthus; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge; USA '66-anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>16.37</u>	<u>0.97</u>	4 USAF '67	<u>17.79</u>	<u>0.66</u>
2 Army Women '77	<u>17.17</u>	<u>0.93</u>	5 US Army '66	<u>17.24</u>	<u>0.98</u>
3 USN '64	<u>17.79</u>	<u>0.70</u>	6 Army Av. '70	<u>17.29</u>	<u>0.71</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.154</u>	<u>.243</u>	<u>.118</u>
	US Army '77	<u>.224</u>	<u>.308</u>	<u>.106</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.7</u>
	US Army '77	<u>5.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>15.1</u>	and	<u>19.5</u>
	FEMALE	<u>15.3</u>	and	<u>20.0</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have longer heads than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; placement of instrument close to but not touching ectocanthus.

## H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ELBOW CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the elbow in a plane perpendicular to the long axis of the arm.
2. BODY POSITION: Standing; upper extremity abducted about 30 degrees.
3. LANDMARK(S): Olecranon process.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	27.67	1.43
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ELBOW CIRCUMFERENCE, FLEXED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The oblique circumference of the elbow bent 90 degrees.
2. BODY POSITION: Standing; arm horizontal; forearm and hand vertical; fist clenched.
3. LANDMARK(S): Olecranon process; elbow crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	26.98	1.78	4 USAF '67	31.24	1.75
2 Army Women '77	25.97	1.61	5 US Army '66		
3 USN '64			6 Army Av. '70		

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66			
US Army '77	.468	.662	.083

COEFFICIENT OF VARIATION: US Army '66	
US Army '77	6.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 22.5 and 30.3

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of pressure exerted on the tape; placing and maintaining the tape on the olecranon process.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ELBOW CIRCUMFERENCE, FLEXED (ELBOW GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The oblique circumference of the elbow bent 90 degrees.
2. BODY POSITION: Standing; arm horizontal; forearm and hand vertical.
3. LANDMARK(S): Olecranon process; elbow crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>26.29</u>	<u>2.24</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of pressure exerted on the tape; placing and maintaining the tape on the olecranon process.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ELBOW CIRCUMFERENCE, FULLY BENT (ELLENBOGENUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the fully bent elbow.
2. BODY POSITION: Standing or sitting; elbow fully flexed.
3. LANDMARK(S): Olecranon process; elbow crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>35.0</u>	<u>1.8</u>	RAF	<u>34.28</u>	<u>1.75</u>
RA	<u>34.63</u>	<u>1.88</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and upper-body garments.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of pressure exerted on the tape; placing and maintaining the tape on the olecranon process.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ELBOW FUNCTIONAL REACH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back of the elbow and the tip of the thumb with the upper arm horizontal and stretched laterally and with the elbow bent 90 degrees in a horizontal plane.
2. BODY POSITION: Standing; arm horizontal and stretched laterally; forearm flexed 90 degrees in a horizontal plane; tip of the second finger touching thumb.
3. LANDMARK(S): Olecranon process; tip of thumb.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: FOREARM-HAND LENGTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	_____	_____
RA	<u>41.12</u>	<u>1.88</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a useful clearance dimension for the design and layout of confined workspaces, e.g., cockpits; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: pressure of the arm against the wall of the measuring rig.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ELBOW REST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the bottom of the elbow bent 90 degrees.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Inferior point of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: The published data of the landmark used are the same. The data indicate that a different interpretation of the landmark was made by the USA and the USAF.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>22.71</u>	<u>2.46</u>	4 USAF '67	<u>25.16</u>	<u>2.61</u>
2 Army Women '77	<u>20.73</u>	<u>2.74</u>	5 US Army '66		
3 USN '64	<u>23.49</u>	<u>2.51</u>	6 Army Av. '70	<u>23.10</u>	<u>2.65</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.308</u>	<u>.166</u>	<u>.104</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>13.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 14.7 and 27.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a required dimension for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities and longer torsos than Blacks, and longer upper extremities and shorter torsos than Asians.

G. REPRODUCIBILITY. A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of body position; the consistency of the landmark identification.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ELBOW REST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the underside of the elbow bent 90 degrees.
2. BODY POSITION: FRG-sitting erect with maximum stretch of the spine; upper arms hang free; forearms horizontal; RA, RAA, RAF-sitting erect; back free of support; shoulders relaxed; elbows lightly against sides; forearms and hands horizontal.
3. LANDMARK(S): Inferior point of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: FRG-anthropometer; RA, RAA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-maximum stretch of the spine.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	24.05	2.52
FRG	<u>23.7</u>	<u>2.5</u>	RAF	<u>24.81</u>	<u>2.45</u>
RA	<u>25.38</u>	<u>3.13</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of the body position; the consistency of landmark identification.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ELBOW REST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the bottom of the elbow bent 90 degrees.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Inferior point of olecranon process of flexed elbow.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>24.53</u>	<u>2.88</u>
Women	<u>23.44</u>	<u>2.78</u>
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of body position; the consistency of landmark identification.

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ELBOW-CENTER OF GRIP LENGTH (ELBOW-GRIP LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back of the elbow and the center of a rod clasped in the hand of a subject whose upper arm is vertical and whose elbow is bent 90 degrees.
2. BODY POSITION: Anthropometric sitting; hand gripping rod held in a vertical plane.
3. LANDMARK(S): Olecranon process.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>35.20</u>	<u>1.62</u>
2 Army Women '77	<u>32.25</u>	<u>1.76</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.689</u>	<u>.438</u>	<u>.105</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>5.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 28.4 and 36.8

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required for the development of a body-link system; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter forearms than Blacks and longer forearms than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ELBOW-ELBOW BREADTH (FOREARM-FOREARM BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside of the elbows bent 90 degrees.
2. BODY POSITION: USA '66-sitting erect; elbows flexed 90 degrees and "held" against the sides; USA '70-sitting erect; elbows flexed 90 degrees and "touching" sides.
3. LANDMARK(S): USA '66-indeterminate "maximum breadth... including the arms at the level of the forearm muscles"; USA '70-"elbows at the level of the forearm musculature".
4. INSTRUMENTS/EQUIPMENT:
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: The elbows were probably held more tightly against the sides in the USA '66 survey than in the USA '70 survey. The landmarks are probably the same in both surveys.

ALTERNATIVE DIMENSIONS: FOREARM-FOREARM BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	<u>45.98</u>	<u>4.22</u>
3 USN '64	_____	_____	6 Army Av. '70	<u>50.57</u>	<u>4.46</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.158</u>	<u>.766</u>	<u>.246</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>9.2</u>
	US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 37.9 and 57.6  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Forearm-Forearm Breadth is the more useful dimension for the design and layout of seated workspaces and for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of the position of the arms; the consistency of the landmark locations.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ELBOW-ELBOW BREADTH (BREITE ÜBER DEN ELLENBOGEN)  
(INTER-ELBOW BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside of the elbows bent 90 degrees.
2. BODY POSITION: Sitting erect; elbows flexed 90 degrees and touching the sides of the torso.
3. LANDMARK(S): Lateral humeral epicondyles.
4. INSTRUMENTS/EQUIPMENT: FR- body caliper; RAA- beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: FOREARM-FOREARM BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	<u>47.62</u>	<u>4.35</u>
FRG	<u>44.5</u>	<u>3.1</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: Forearm-Forearm Breadth is the more useful dimension for the design and layout of seated workspaces and for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the consistency of the position of the arms; the consistency of maintaining the caliper on the lateral humeral epicondyles.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: ELBOW-ELBOW BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside of the elbows bent 90 degrees and held as tightly as possible against the sides.
2. BODY POSITION: Sitting erect; forearms flexed 90 degrees; hands open with palms facing each other; elbows pressed as tightly as possible against the sides.
3. LANDMARK(S): Lateral humeral epicondyles.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: FOREARM-FOREARM BREADTH

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>41.55</u>	<u>4.63</u>
Women	<u>37.59</u>	<u>5.05</u>
HANES		
Men	_____	_____
Women	_____	_____

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: the arm position used in this survey yields a measurement of little or even misleading value.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of the position of the arms; the consistency of maintaining the caliper on the lateral humeral epicondyles.

F. PARTICULARLY SENSITIVE TO: the definition of the landmark; position of the arms.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ELBOW-ELBOW SPAN (ELLENBOGENSPANWEITE) (INTER-ELBOW SPAN)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the elbows with the upper arms horizontal and stretched laterally and the forearms bent 90 degrees in a horizontal plane.
2. BODY POSITION: Standing erect (FRG-sitting or standing); arms horizontal and stretched laterally, elbows flexed 90 degrees in a horizontal plane.
3. LANDMARK(S): Olecranon process.
4. INSTRUMENTS/EQUIPMENT: FRG-anthropometer; RA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>93.5</u>	<u>4.0</u>	RAF	<u>*99.06</u>	<u>4.26</u>
RA	<u>95.25</u>	<u>4.55</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design and layout of seated workspaces particularly in confined areas such as cockpits.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the landmark definition; body position.

\*The difference between the mean values of the RA and the RAF is inexplicable since the same measuring technique is reported; it most likely reflects a difference in body position, i.e. pressure of the forearm against the wall of the measuring rig.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: EYE HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and a corner of an eye.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): USN '64, USA '66-endocanthus; USAF '67, USAF '68, USA '70, USA '77-ectocanthus.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>73.70</u>	<u>3.06</u>	4 USAF '67	<u>80.95</u>	<u>3.02</u>
2 Army Women '77	<u>73.64</u>	<u>3.46</u>	5 US Army '66	<u>78.72</u>	<u>3.57</u>
3 USN '64	<u>80.18</u>	<u>3.01</u>	6 Army Av. '70	<u>78.80</u>	<u>3.15</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.653</u>	<u>.359</u>	<u>-.054</u>
US Army '77	<u>.738</u>	<u>.399</u>	<u>.098</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.5</u>
	US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 70.1 and 87.0  
FEMALE 65.3 and 81.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design and layout of aircraft cockpits; often required for the design and layout of seated workspaces; required for the development of body-link system; often a key dimension for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have longer torsos than Blacks and shorter torsos than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: maintaining the required body position; subject's and anthropometrist's apprehension of measurements taken close to the eyes.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: EYE HEIGHT, SITTING (AUGENHÖHE IM SITZEN)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and an eye.
2. BODY POSITION: FRG-sitting erect with maximum stretch, head in the Frankfurt plane; RAA-anthropometric sitting.
3. LANDMARK(S): FRG-endocanthus; RAA-center of pupil.
4. INSTRUMENTS/EQUIPMENT: FRG- anthropometer; RAA- measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-body position.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF			RAA	<u>80.18</u>	<u>3.10</u>
FRG	<u>80.2</u>	<u>3.1</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension for the design and layout of aircraft cockpits; often required for the design and layout of seated workspaces; required for the development of a body-link system; often a key dimension for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: maintaining required body position; subject's and anthropometrist's apprehension of measurements taken close to the eyes.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FEMORAL EPICONDYLE BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight-line distance between the inside and the outside bony projections of the knee. (Strong pressure is used to compress the tissue when taking the measurement.)
2. BODY POSITION: Sitting, knee flexed 90 degrees.
3. LANDMARK(S): Lateral and medial point of the femoral epicondyles.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	8.12	0.45	4 USAF '67	9.98	0.45
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful only in assessing body composition and body typology.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FIBULAR HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the standing surface to the top of the fibula (the outside bone of the lower leg).
2. BODY POSITION: Standing.
3. LANDMARK(S): Superior point of the fibula.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: TIBIALE HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	43.87	2.25
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66	_____	_____	_____
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Tibiale Height is the preferred dimension for the development of a body-link system.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter legs than Blacks and longer legs than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the accurate location of the landmark.

# ANTHROPOMETRIC SURVEYS OF U S. MILITARY PERSONNEL

VARIABLE NAME: FINGER DIAMETER (DIGIT III)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The greatest diameter of the third finger.

2. BODY POSITION:

3. LANDMARK(S): Maximum diameter of digit III.

4. INSTRUMENTS/EQUIPMENT: Board with graduated holes.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	<u>3.74</u>	<u>0.44</u>	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
US Army '77                            

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of hand and finger dimensions required for developing sizing systems/programs for gloves.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger fingers than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the judgment of the minimum size hole digit III can "comfortably" pass through.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOOT BREADTH (BALL OF FOOT BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance across the foot between the inside and outside of the ball of the foot. The maximum horizontal breadth of the foot.
2. BODY POSITION: Standing; weight distributed equally on both feet.
3. LANDMARK(S): Lateral and medial points of the foot.
4. INSTRUMENTS/EQUIPMENT: Foot box.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>8.87</u>	<u>0.50</u>	4 USAF '67	<u>9.77</u>	<u>0.50</u>
2 Army Women '77	<u>8.87</u>	<u>0.51</u>	5 US Army '66	<u>9.84</u>	<u>0.55</u>
3 USN '64	<u>10.25</u>	<u>0.77</u>	6 Army Av. '70	<u>9.99</u>	<u>0.60</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.414</u>	<u>.494</u>	<u>-.022</u>
US Army '77	<u>.413</u>	<u>.493</u>	<u>-.004</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.6</u>
	US Army '77	<u>5.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>8.6</u>	and	<u>11.2</u>
	FEMALE	<u>7.7</u>	and	<u>10.2</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement, and issuing of foot gear; required to select microcosm populations upon whom adequate dimensions are measured for the development of shoe lasts; required for the selection of subjects used to evaluate new footwear; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites tend on the average to have narrower feet than Blacks and Asians. Among men and women of like body size, men tend on the average to have larger feet than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the position of the foot in the foot box.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: FOOT BREADTH (BALL OF FOOT BREADTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the foot.
2. BODY POSITION: CF, RAA-standing; weight distributed equally on both feet;  
RA, RAF-sitting.
3. LANDMARK(S): Lateral and medial points of the foot.
4. INSTRUMENTS/EQUIPMENT: Foot box.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Body position (RA,  
RAF-feet do not support total body weight).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>9.74</u>	<u>0.47</u>	RAA	<u>9.85</u>	<u>0.46</u>
FRG			RAF	<u>9.54</u>	<u>0.44</u>
RA	<u>9.54</u>	<u>0.46</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement, and issuing of foot gear; required to select microcosm populations upon whom adequate dimensions are measured for the development of shoe lasts; required for the selection of subjects used to evaluate new footwear; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the position of the foot in the foot box.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOOT LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tip of the heel and the tip of the longest toe parallel with the long axis of the foot.
2. BODY POSITION: Standing; weight distributed equally on both feet.
3. LANDMARK(S): Pterion, acropodion.
4. INSTRUMENTS/EQUIPMENT: Foot box.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>24.07</u>	<u>1.13</u>	4 USAF '67	<u>27.03</u>	<u>1.19</u>
2 Army Women '77	<u>24.32</u>	<u>1.25</u>	5 US Army '66	<u>26.78</u>	<u>1.30</u>
3 USN '64	<u>26.62</u>	<u>1.20</u>	6 Army Av. '70	<u>26.49</u>	<u>1.27</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.678</u>	<u>.485</u>	<u>.009</u>
US Army '77	<u>.693</u>	<u>.517</u>	<u>.054</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>4.9</u>	<u>5.1</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>23.8</u>	and	<u>30.0</u>
	FEMALE	<u>21.6</u>	and	<u>27.5</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of foot gear; required to select microcosm populations upon whom adequate dimensions are measured for the development of shoe lasts; required for the selection of subjects used to evaluate new footwear; required for the development of a body-link system; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have shorter feet than Blacks (expressed primarily in the more elongated calcanei of Blacks). Among men and women of like body size, men tend on the average to have larger feet than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the position of the foot in the foot box.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: FOOT LENGTH (FUSSLANGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tip of the heel and the tip of the longest toe parallel with the long axis of the foot.
2. BODY POSITION: CF, FRG, RAA-standing; RA, RAF-sitting.
3. LANDMARK(S): Pterion; acropodion.
4. INSTRUMENTS/EQUIPMENT: Foot box.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Body position (RA, RAF-feet do not support total body weight).

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>26.45</u>	<u>1.20</u>	RAA	<u>26.33</u>	<u>1.19</u>
FRG	<u>26.1</u>	<u>1.2</u>	RAF	<u>26.59</u>	<u>1.21</u>
RA	<u>26.13</u>	<u>1.13</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement, and issuing of foot gear; required to select microcosm populations upon whom adequate dimensions are measured for the development of shoe lasts; required for the selection of subjects used to evaluate new footwear; required for the development of anthropomorphic analogues; required for the development of a body-link system

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the position of the foot in the foot box.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOREARM CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the forearm perpendicular to its long axis.
2. BODY POSITION: Standing; upper extremity relaxed at side.
3. LANDMARK(S): USAF '67, USAF '68- 0.6 cm distal to the arm/forearm juncture established with the elbow flexed 90 degrees and the fist clenched; USA '77-level of the maximum circumference of the forearm.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Method of locating the landmark.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	23.48	1.38	4 USAF '67	28.16	1.46
2 Army Women '77	23.28	1.50	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66			
US Army '77	.360	.835	.151

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	6.4

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 20.5 and 27.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the construction of clothing manikins;  
useful for the design and sizing of gloves that extend along the wrist;  
useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOREARM CIRCUMFERENCE, FLEXED (LOWER ARM CIRCUMFERENCE, FLEXED)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the upper end of the forearm.
2. BODY POSITION: Standing; upper arm extended forward horizontally; elbow flexed 90 degrees; fist clenched.
3. LANDMARK(S): USN '64, USA '66, USA '70, USA '77-level of maximum circumference; USAF '67, USAF '66-level of a tape width (6 mm) distal to the elbow crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Location of landmark.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>24.98</u>	<u>1.52</u>	4 USAF '67	<u>29.77</u>	<u>1.58</u>
2 Army Women '77	<u>24.62</u>	<u>1.52</u>	5 US Army '66	<u>29.43</u>	<u>2.15</u>
3 USN '64	<u>30.05</u>	<u>1.75</u>	6 Army Av. '70	<u>29.20</u>	<u>1.77</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.251</u>	<u>.684</u>	<u>.164</u>
	US Army '77	<u>.334</u>	<u>.780</u>	<u>.113</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>7.3</u>
	US Army '77	<u>6.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 24.8 and 35.1  
FEMALE 21.2 and 28.3

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: muscle tension of the clenched fist.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: FOREARM CIRCUMFERENCE, FLEXED (FOREARM GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the forearm perpendicular to its long axis.
2. BODY POSITION: Standing; arm relaxed at side; elbow flexed 90 degrees; hands and fingers extended.
3. LANDMARK(S): Upper arm/forearm juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: FOREARM CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>24.77</u>	<u>2.13</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOREARM-FOREARM BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the outside edges of the forearms of a subject with the elbows bent 90 degrees.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Lateral points of the forearms.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	54.32	3.78
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required as a seated clearance dimension;  
 required for the design and layout of seated workspaces; can be a measure  
 of cockpit accommodation; required for the development of anthropomorphic  
 analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the position of the upper arms.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOREARM-HAND LENGTH (ELBOW-FINGER TIP LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back tip of the elbow and the tip of the middle finger with the elbow bent 90 degrees.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Dactylion; posterior point of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>43.52</u>	<u>2.28</u>	5 US Army '66	<u>47.96</u>	<u>2.31</u>
3 USN '64	<u>48.47</u>	<u>1.90</u>	6 Army Av. '70	<u>48.14</u>	<u>2.09</u>

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army '66		<u>.754</u>	<u>.452</u>	<u>.014</u>
US Army '77		<u>.731</u>	<u>.451</u>	<u>.047</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.8</u>
	US Army '77	<u>5.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 42.7 and 53.8  
FEMALE 38.7 and 49.2

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter forearms than Blacks and longer forearms than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: FOREARM-HAND LENGTH (ELBOW-FINGERTIP LENGTH)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The distance between the back of the elbow and the tip of the middle finger with the upper arm horizontal and stretched laterally and the forearm bent 90 degrees in a horizontal plane.
2. BODY POSITION: Standing erect; arm horizontal and stretched laterally; forearm flexed 90 degrees in a horizontal plane; hand and fingers extended.
3. LANDMARK(S): Dactylion; posterior point of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>47.98</u>	<u>2.04</u>
RA	<u>47.05</u>	<u>1.95</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FOREARM-WRIST LENGTH (ELBOW-WRIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back of the elbow bent 90 degrees and the wrist.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Posterior point of the olecranon process; stylium.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	29.99	1.41
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; a potential aircraft accommodation criterion; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter forearms than Blacks and longer forearms than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: FOREARM-WRIST LENGTH (ELBOW-WRIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the back of the elbow bent 90 degrees and the wrist.
2. BODY POSITION: Standing erect; upper arm horizontal and stretched laterally; forearm flexed 90 degrees in a horizontal plane; thumb and digit II opposed.
3. LANDMARK(S): Posterior point of the olecranon process; stylium.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>28.84</u>	<u>1.42</u>
RA	<u>28.17</u>	<u>1.51</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces; a potential criterion for aircraft accommodation; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: FUNCTIONAL LEG LENGTH (BUTTOCK-HEEL LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance along the long axis of the leg between the foot and the back of a subject seated with the leg extended and the heel on the floor.
2. BODY POSITION: Sitting erect; leg extended; foot flexed 90 degrees; heel on the floor.
3. LANDMARK(S): Plantar surface of the foot; posterior surface on the back [Report of USA '70 states waist level (omphalion) is the posterior landmark. This is most likely not so.]
4. INSTRUMENTS/EQUIPMENT: Anthropometer with a foot plate.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USA '70-unclothed; USA '77-clothed (269 wore fatigues and boots; 31 wore slacks and shoes).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>108.92</u>	<u>5.78</u>	5 US Army '66		
3 USN '64			6 Army Av. '70	<u>112.17</u>	<u>4.99</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.804</u>	<u>.481</u>	

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>5.3</u>

\*5th and 95th US ARMY '66 and '77 PERCENTILE VALUES: MALE 99.6 and 118.7  
FEMALE 99.6 and 118.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces with foot operated controls; a measurement of cockpit accommodation; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower extremities than Asians.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of body position (degree of leg extension); consistency of maintaining the anthropometer in its proper alignment.

## H. PARTICULARLY SENSITIVE TO

\*n = 300

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: FUNCTIONAL LEG LENGTH (BUTTOCK-HEEL LENGTH)  
(GESASS-BEINLANGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the plane of the back and the heel of the outstretched leg.
2. BODY POSITION: RA, RAA, RAF-sitting on the floor, buttock pressed hard against wall, legs fully extended, foot vertical; FRG-sitting erect on sitting surface, leg fully extended, foot vertical.
3. LANDMARK(S): RA, RAA, RAF-back plane, distal point of heel; FRG-posterior point of the buttock; distal point of the heel.
4. INSTRUMENTS/EQUIPMENT: RA, RAA, RAF-measuring rig; FRG-anthropomet
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: body position-subjects sitting as far back as possible against a back support cannot fully extend their legs.

ALTERNATIVE DIMENSIONS: FUNCTIONAL LEG LENGTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	106.27	4.76
FRG	<u>103.2</u>	<u>4.6</u>	RAF	<u>108.99</u>	<u>5.14</u>
RA	<u>107.85</u>	<u>5.41</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a marginal approximation of functional leg reach required for the design of seated workspaces and of aircraft accommodation. Though the FRG measuring technique yields a closer approximation of functional leg length, Functional Leg Length as measured by U.S. Military is believed to yield a more realistic measurement.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: RA, RAA, RAF consistency of the body position (degree of leg extension); pressure applied against the buttocks.

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: GLABELLA-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from a point on the forehead between the eyebrows to the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Glabella; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>9.27</u>	<u>0.97</u>
2 Army Women '77	<u>8.44</u>	<u>0.87</u>	5 US Army '66		
3 USN '64			6 Army Av. '70	<u>8.64</u>	<u>0.92</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.151</u>	<u>.146</u>	<u>.018</u>

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77 <u>10.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE          and           
FEMALE 6.7 and 10.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Asian males of like body size, Whites tend on the average to have lower cranial vaults than Asians. Among men and women of like body size, men tend on the average to have higher cranial vaults than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: GLABELLA-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the plane at the back of the head to the forehead between the eyebrows.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Glabella; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	20.35	.067
2 Army Women '77	19.29	0.98	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.263	.365	.110

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	5.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 17.2 and 22.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have longer heads than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: GLUTEAL ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the lowest point of a crease at the buttock/leg juncture and the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Lowest point of the gluteal furrow; waist level (greatest lateral indentation of the abdominal region-natural waist line).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	<u>27.70</u>	<u>2.00</u>	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: of marginal use for the design and sizing of single- and lower-body garments; Crotch Length is the preferred dimension.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger buttocks than Blacks. Among men and women of like body size, men tend on the average to have smaller buttocks than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: GLUTEAL FURROW HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the lowest point of the lowest crease of the buttock/leg juncture.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Lowest point of the inferior crease of the gluteal furrow.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: None known, but the data from the USAF '68 and the USA '77 surveys indicate a possible difference in landmark interpretation or perhaps they reflect a greater percentage of Blacks in the Army survey.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>72.70</u>	<u>3.96</u>	4 USAF '67	<u>81.11</u>	<u>4.01</u>
2 Army Women '77	<u>74.13</u>	<u>4.06</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>81.31</u>	<u>4.00</u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.829</u>	<u>.486</u>	<u>.026</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 5.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 65.6 and 84.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: GRIP DIAMETER, INSIDE (INNER HAND GRIP CIRCUMFERENCE)  
(GRIFFUMFANG DER HAND)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the hand grip as measured by the subject grasping a graduated cone.
2. BODY POSITION: RAA- the hand grasping a cone at the maximum diameter at which the thumb and digit III can be lightly opposed; FRG- the hand grasping a cone at the maximum diameter at which the fingers lightly touch the palm; thumb slightly abducted.
3. LANDMARK(S):
4. INSTRUMENTS/EQUIPMENT: Graduated cone.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different grasping.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	<u>16.50</u>	<u>1.12</u>
FRG	<u>13.9</u>	<u>1.0</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design of hand-held controls.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: consistency of grip position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: GRIP STRENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum force that a subject can apply to a hand dynamometer.

2. BODY POSITION: Standing.

3. LANDMARK(S):

4. INSTRUMENTS/EQUIPMENT: Smedley hand dynamometer.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	29.86	5.70	4 USAF '67	56.38	7.60
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: 

US Army '66	
US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE		and	
FEMALE		and	

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Grip Strength is a poor indicator of total body strength.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have about 34 percent more upper body strength than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: subject motivation; adjustment, if any, of hand grip to individual preference.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND BREADTH (HAND BREADTH AT METACARPALE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The breadth of the hand.
2. BODY POSITION: Hand pronated; fingers extended.
3. LANDMARK(S): Metacarpale laterale; metacarpale mediale.
4. INSTRUMENTS/EQUIPMENT: Sliding calipers.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>7.55</u>	<u>0.39</u>	4 USAF '67	<u>8.90</u>	<u>0.41</u>
2 Army Women '77	<u>7.82</u>	<u>0.39</u>	5 US Army '66	<u>8.90</u>	<u>0.49</u>
3 USN '64	<u>8.96</u>	<u>0.42</u>	6 Army Av. '70	<u>8.85</u>	<u>0.41</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.401</u>	<u>.442</u>	<u>.018</u>
US Army '77	<u>.433</u>	<u>.508</u>	<u>.045</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>5.5</u>	<u>5.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>7.8</u>	and	<u>10.1</u>
	FEMALE	<u>7.0</u>	and	<u>8.7</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of gloves; required for selecting microcosm populations upon whom adequate dimensions are measured to develop glove-sizing systems/programs; required for the development of anthropomorphic analogues; an essential dimension for the design of maintenance accesses and panel control clearances.

RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 In WHAT WAY? Among men and women of like body size, men tend on the average to have larger hands than women.

F. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HAND BREADTH (HAND BREADTH AT METACARPALE) (HANDBREITE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The breadth of the hand.
2. BODY POSITION: CF-hand flat on table with fingers together; FRG-hand and fingers extended; RAA-hand on table; palm up; fingers extended.
3. LANDMARK(S): Metacarpale II; Metacarpale V.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>8.91</u>	<u>0.45</u>	RAA	<u>8.23</u>	<u>0.41</u>
FRG	<u>8.5</u>	<u>0.4</u>	RAF		
RA	<u>8.57</u>	<u>0.45</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of gloves; required for selecting microcosm populations upon whom adequate dimensions are measured to develop glove-sizing systems/programs; required for the development of anthropomorphic analogues; an essential dimension for the design of maintenance accesses and panel control clearances.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND BREADTH ACROSS THUMB

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the base of the thumb and the little finger side of the hand.
2. BODY POSITION: Sitting; hand flat on table; thumb lightly touching side of hand.
3. LANDMARK(S): Phalangion I; ulnar side of the hand.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	10.19	0.50
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	10.66	0.50	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of glove sizing systems/programs; an important clearance dimension for the design of hand accesses.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger hands than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: flatness of the hand; degree of thumb abduction.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the hand not including the thumb.
2. BODY POSITION: Hand and fingers extended; fingers together; thumb slightly abducted.
3. LANDMARK(S): Metacarpale laterale; metacarpale mediale.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>18.32</u>	<u>0.91</u>	4 USAF '67	<u>21.55</u>	<u>0.94</u>
2 Army Women '77	<u>18.45</u>	<u>0.86</u>	5 US Army '66	<u>21.61</u>	<u>1.14</u>
3 USN '64	<u>21.39</u>	<u>1.00</u>	6 Army Av. '70	<u>21.17</u>	<u>1.00</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.369</u>	<u>.497</u>	<u>.070</u>
	US Army '77	<u>.448</u>	<u>.534</u>	<u>.047</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.3</u>
	US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>19.1</u>	and	<u>24.5</u>
	FEMALE	<u>16.5</u>	and	<u>20.4</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of gloves.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger hands than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the flatness of the hand; the degree of thumb abduction.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HAND CIRCUMFERENCE (HANDUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the hand not including the thumb.
2. BODY POSITION: Hand and fingers extended; fingers together; thumb slightly abducted.
3. LANDMARK(S): Metacarpale laterale; metacarpale mediale; medial point of metacarpale V.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD	<u>SURVEY</u>	$\bar{X}$	SD
CF			RAA		
FRG	<u>21.3</u>	<u>1.0</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of gloves.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the flatness of the hand; the degree of thumb abduction.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND CIRCUMFERENCE INCLUDING THUMB

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hand with the tape passing over the base of the thumb.
2. BODY POSITION: Sitting; hand flat on table; thumb lightly touching side of hand.
3. LANDMARK(S): Phalange I; ulnar side of the hand.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	25.75	1.08
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	25.47	1.13	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of hand and finger dimensions required for the developing of sizing systems/programs for gloves.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger hands than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the flatness of the hand; degree of thumb abduction.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The length of the hand.
2. BODY POSITION: Hand supinated; fingers extended.
3. LANDMARK(S): Wrist (USN '64-proximal end of navicular; USA '66, USA '77-distal wrist crease; USAF '67, USAF '68-styilion; USA '70-styilion ulnae); dactylion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>18.38</u>	<u>0.96</u>	4 USAF '67	<u>19.11</u>	<u>0.82</u>
2 Army Women '77	<u>17.44</u>	<u>0.90</u>	5 US Army '66	<u>19.03</u>	<u>0.96</u>
3 USN '64	<u>19.13</u>	<u>0.86</u>	6 Army Av. '70	<u>19.20</u>	<u>0.87</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
	<u>.614</u>	<u>.634</u>	<u>.404</u>	<u>.400</u>	<u>.029</u>
			<u>.400</u>	<u>.400</u>	<u>.026</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.1</u>
	US Army '77	<u>5.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>16.9</u>	and	<u>21.4</u>
	FEMALE	<u>15.5</u>	and	<u>19.7</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension required for the design, sizing, procurement, and issuing of gloves; required to select microcosm populations upon whom adequate dimensions are measured to develop sizing systems for gloves; (may be required to derive various reach dimensions) required for the design and layout of workspaces and aircraft accommodation criteria; required for the development of a body-link system; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have shorter hands than Blacks. Among men and women of like body size, men tend on the average to have larger hands than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of wrist level, flexion or extension of the fingers.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HAND LENGTH (HANDLÄNGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The length of the hand.
2. BODY POSITION: CF-hand flat on the table with palm up; fingers together and extended; FRG-hand and fingers extended.
3. LANDMARK(S): Wrist (CF -distal wrist crease, FRG-stylian, RAA-first major skin crease proximal to hypothenar eminence); dactylion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-definition of wrist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>19.20</u>	<u>0.88</u>	RAA	<u>19.12</u>	<u>0.85</u>
FRG	<u>18.4</u>	<u>1.0</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: a key dimension required for the design, sizing, procurement and issuing of gloves; required to select microcosm populations upon whom adequate dimensions are measured to develop sizing systems for gloves; may be required to derive various reach dimensions required for the design and layout of workspaces and aircraft accommodation criteria; required for the development of a body-link system; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of wrist level; flexion of the fingers.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HAND THICKNESS

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the palm and the top of the third knuckle.
2. BODY POSITION: Hand and fingers extended.
3. LANDMARK(S): Phalangion III (Metacarpale III).
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	2.77	0.21
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	3.11	0.21	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US Army '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a useful clearance dimension for the design of maintenance accesses; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the pressure applied to the caliper; maintaining the tip of the caliper on phalangion III.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HAND THICKNESS (HANDDICKE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the palm and the top of the third knuckle.
2. BODY POSITION: Hand and fingers extended.
3. LANDMARK(S): Phalangion III (metacarpale III).
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>2.6</u>	<u>0.2</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a useful clearance dimension for the design of maintenance accesses; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the pressure applied to the caliper; maintaining the tip of the caliper on phalangion III.

## F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEAD BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the head above the ears.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Euria.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>14.52</u>	<u>0.59</u>	4 USAF '67	<u>15.60</u>	<u>0.54</u>
2 Army Women '77	<u>14.61</u>	<u>0.54</u>	5 US Army '66	<u>15.27</u>	<u>0.59</u>
3 USN '64	<u>15.56</u>	<u>0.53</u>	6 Army Av. '70	<u>15.26</u>	<u>0.53</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.128</u>	<u>.351</u>	<u>.105</u>
US Army '77	<u>.154</u>	<u>.317</u>	<u>.193</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>3.9</u>
	US Army '77	<u>3.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>13.9</u> and <u>16.7</u>
	FEMALE	<u>13.4</u> and <u>16.1</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required to select microcosm populations upon whom adequate dimensions are measured to develop sizing systems for equipment worn on the head; required for the design and sizing, and if used as a key dimension, the procurement and issuing of equipment worn on the head; required as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design of equipment worn on the head; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Black, and Asian males of like body size, Whites and Blacks tend on the average to have narrower heads than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF A OR C, THE PROBLEM IS.

IF B, SPECIFICALLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HEAD BREADTH (GRÖSSTE KOPFBREITE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the head above the ears.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Euria.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	<u>15.40</u>	<u>5.40</u>
FRG	<u>15.7</u>	<u>0.5</u>	RAF		
RA	<u>15.44</u>	<u>0.55</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for selecting microcosm populations upon whom adequate dimensions are measured to develop sizing systems for equipment worn on the head; required for the design, sizing, and if used as a key dimension, the procurement, and issuing of equipment worn on the head; required as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design of equipment worn on the head; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEAD CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Superior to the supraorbital ridges, opisthocranium.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>54.87</u>	<u>1.62</u>	4 USAF '67	<u>57.52</u>	<u>1.43</u>
2 Army Women '77	<u>54.92</u>	<u>1.64</u>	5 US Army '66	<u>56.11</u>	<u>1.43</u>
3 USN '64	<u>57.54</u>	<u>1.40</u>	6 Army Av. '70	<u>56.31</u>	<u>1.53</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
	<u>.268</u>	<u>.364</u>	<u>.461</u>	<u>.409</u>	<u>.141</u>
			<u>.090</u>		

COEFFICIENT OF VARIATION:	US Army '66	<u>2.9</u>
	US Army '77	<u>3.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>52.4</u>	and	<u>60.0</u>
	FEMALE	<u>51.4</u>	and	<u>59.3</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement, and issuing of hats and equipment worn on the head; required as one in a series of dimensions for the development of three-dimensional head forms used to guide the design of equipment worn on the head; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites and Blacks tend on the average to have lower cranial indices than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HEAD CIRCUMFERENCE (HORIZONTALUMFANG DES KOPFES)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): CF, RAF-superior to the supraorbital ridges, occiput; FRG, RA, RAA-superior to the supraorbital ridges, opisthocranium.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF, RAF-measurement taken in the horizontal plane; FRG-measurement taken in an approximately horizontal plane.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>57.75</u>	<u>1.52</u>	RAA	<u>57.24</u>	<u>1.59</u>
FRG	<u>57.3</u>	<u>1.4</u>	RAF	<u>57.67</u>	<u>1.36</u>
RA	<u>57.08</u>	<u>1.58</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of hats and equipment worn on the head; required as one in a series of dimensions for the development of three-dimensional head forms used to guide the design of equipment worn on the head; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEAD DIAGONAL MAXIMUM (MENTON-OCCIPUT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum distance between the tip of the chin and the back of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; occiput.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	25.60	0.76
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design of neck rings and similarly rigid neck openings of pressure suits and other items of personal protective equipment, such as total body encapsulation suits.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: pressure of the caliper on menton.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HEAD DIAGONAL MAXIMUM (MENTON-OCCIPUT)  
(MAXIMUM HEAD DIAGONAL FROM MENTON)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum straight-line distance between the tip of the chin and the back of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; occiput.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>26.21</u>	<u>0.77</u>
RA	<u>25.64</u>	<u>0.80</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful only for the design of n. rings of pressure suits and similar items.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: pressure of the caliper on menton.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEAD DIAGONAL MAXIMUM (sic) (PRONASLE-INION)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the tip of the nose and the base of the back of the head.

2. BODY POSITION: Sitting.

3. LANDMARK(S): Pronasale; inion.

4. INSTRUMENTS/EQUIPMENT: Spreading caliper.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: HEAD DIAGONAL MAXIMUM (MENTON-OCCIPUT)

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	21.94	1.01
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: there is no demonstrated use for this dimension.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: compression of the tip of the nose; the precise location of inion which is often indistinct on women.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEAD LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum distance from the forehead between the brow ridges to the back of the head.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Glabella; opisthocranion.
4. INSTRUMENTS/EQUIPMENT: Spreading calipers.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>18.41</u>	<u>0.68</u>	4 USAF '67	<u>19.87</u>	<u>0.67</u>
2 Army Women '77	<u>18.71</u>	<u>0.67</u>	5 US Army '66	<u>19.47</u>	<u>0.73</u>
3 USN '64	<u>19.83</u>	<u>0.66</u>	6 Army Av. '70	<u>19.70</u>	<u>0.67</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '64	<u>.281</u>	<u>.321</u>	<u>.109</u>
US Army '77	<u>.370</u>	<u>.371</u>	<u>.016</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>3.8</u>
	US Army '77	<u>3.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 17.8 and 21.2  
FEMALE 17.1 and 20.3

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for selecting microcosm populations upon whom adequate dimensions are measured to develop sizing systems for equipment worn on the head; required for the design and sizing, and if used as a key dimension, procurement and issuing of equipment worn on the head; required for the development of three-dimensional head forms used to guide the design of equipment worn on the head; useful for the design of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites and Blacks tend on the average to have longer heads than Asians. Among men and women of like body size, men tend to have longer heads than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HEAD LENGTH (KOPFLÄNGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the forehead between the brow ridges and the back of the head.
2. BODY POSITION: Sitting; RA, RAF-head in the Frankfort plane.
3. LANDMARK(S): FRG - glabella, opisthocranium; RA, RAF-glabella, plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: FRG - spreading caliper; RA, RAF-head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-maximum distance; RA, RAF - horizontal distance.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>19.4</u>	<u>0.7</u>	RAF	<u>19.90</u>	<u>0.64</u>
RA	<u>19.53</u>	<u>0.73</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for selecting microcosm populations upon whom adequate dimensions are measured to develop sizing systems for equipment worn on the head; required for the design, sizing, and if used as a key dimension, procurement and issuing of equipment worn on the head; the maximum distance dimension is required for the development of three-dimensional head forms used to guide the design of equipment worn on the head; useful for the design of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: RA, RAF maintaining the head in the Frankfort plane.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEEL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal breadth of the heel.
2. BODY POSITION: Standing; feet slightly apart; weight distributed equally on both feet.
3. LANDMARK(S): USA '66 (?) USA '77 - the maximum horizontal breadth of the calcaneus; USA '70 - the breadth near the top of the calcaneus (to correspond with the top of the shoe).
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>6.09</u>	<u>0.41</u>	5 US Army '66	<u>6.86</u>	<u>0.47</u>
3 USN '64			6 Army Av. '70	<u>4.55</u>	<u>0.39</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.274</u>	<u>.533</u>	<u>.137</u>
US Army '77	<u>.306</u>	<u>.499</u>	<u>.126</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>6.9</u>	<u>6.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>5.9</u>	and	<u>8.1</u>
	FEMALE	<u>5.2</u>	and	<u>7.2</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of shoe lasts.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the av. to have wider and less elongated calcanei than Blacks.

G. REPRODUCIBILITY: A ☐ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

USA '66 USA '77 - A

USA '70 - B: the consistent location of the level and depth at which the measurement is taken.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HEEL-ANKLE CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: A diagonal circumference of the foot with the tape passing under the tip of the heel and over the calf/foot juncture.
2. BODY POSITION: Standing.
3. LANDMARK(S): Posterior point of the heel; tibialion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>33.95</u>	<u>1.41</u>
2 Army Women '77	<u>30.79</u>	<u>1.46</u>	5 US Army '66	<u>34.11</u>	<u>1.66</u>
3 USN '64			6 Army Av. '70	<u>33.30</u>	<u>1.57</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.571</u>	<u>.630</u>	<u>.044</u>
			<u>.616</u>	<u>.642</u>	<u>.052</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.8</u>
	US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>30.3</u>	and	<u>38.2</u>
	FEMALE	<u>27.7</u>	and	<u>34.6</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of lasts.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites and Asians tend on the average to have less protruding heels than Blacks. Among men and women of like body size, men tend on the average to have larger feet than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of placing and maintaining the tape on the heel point.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HEEL-ANKLE CIRCUMFERENCE, EXTENDED (HEEL-INSTEP CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the heel-instep of a subject with a heel raised to maximum height while the toes remain on the standing surface.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Maximum prominence of the heel; tibialion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>32.54</u>	<u>1.36</u>
RA	<u>32.20</u>	<u>1.40</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design of openings in footwear and single- and lower-body garments with a restricted lower leg opening as found in some protective equipment.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: degree of heel elevation.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIGHEST BUST LEVEL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between points established at the level of the scye above the most prominent protrusion of the breasts.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Points above the most prominent protrusion of the breasts at the level of the right and the left anterior scye.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>18.69</u>	<u>2.06</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: of marginal value for the design and sizing of single- and upper-body garments; of marginal value for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the type and fit of bra if worn (bandeaux were worn in this survey).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the body at the level of the hips.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Maximum lateral protrusion of the hips.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: THIGH-THIGH BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>34.97</u>	<u>2.22</u>	4 USAF '67	<u>35.27</u>	<u>1.88</u>
2 Army Women '77	<u>35.36</u>	<u>2.45</u>	5 US Army '66	<u>33.20</u>	<u>2.01</u>
3 USN '64	<u>35.00</u>	<u>1.78</u>	6 Army Av. '70	<u>35.11</u>	<u>2.12</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.437</u>	<u>.816</u>	<u>.191</u>
	US Army '77	<u>.398</u>	<u>.801</u>	<u>.212</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>6.1</u>
	US Army '77	<u>7.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>29.1</u>	and	<u>38.6</u>
	FEMALE	<u>30.1</u>	and	<u>41.8</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have narrower hips than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP BREADTH OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal breadth of the hips of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Maximum lateral protrusions of the hips.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	33.68	2.14	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP BREADTH, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum breadth of the hips of a seated subject.
2. BODY POSITION: Sitting erect; thighs parallel.
3. LANDMARK(S): Maximum lateral protrusion of the hips.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	37.79	2.30
2 Army Women '77			5 US Army '66	34.16	2.38
3 USN '64	36.81	2.17	6 Army Av. '70	37.79	2.71

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	.388	.854	.201
US Army '77			

COEFFICIENT OF VARIATION:	US Army '66	7.0
	US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 29.5 and 40.7  
FEMALE            and           

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces and as a seated clearance dimension; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have narrower hips than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: HIP BREADTH, SITTING (SITZBREITE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum breadth of the hips of a seated subject.
2. BODY POSITION: Sitting erect; knees together.
3. LANDMARK(S): Maximum lateral protrusion of the hips.
4. INSTRUMENTS/EQUIPMENT: FRG-body caliper or beam caliper; RA, RAA, RAF-beam caliper with paddle blades.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	<u>35.57</u>	<u>2.08</u>
FRG	<u>35.1</u>	<u>3.1</u>	RAF		
RA	<u>35.19</u>	<u>2.08</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces and as a seated clearance dimension; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIP BREADTH, SITTING (SEAT BREADTH)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The maximum horizontal breadth of the hips of a seated subject.
2. BODY POSITION: Sitting erect; knees together.
3. LANDMARK(S): Maximum lateral protrusion of the hips.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: THIGH-THIGH BREADTH, SITTING

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>35.33</u>	<u>2.85</u>
Women	<u>36.24</u>	<u>3.68</u>
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the design and layout of seated workspaces; required as a seated clearance dimension; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIP CIRCUMFERENCE AT TROCHANTERION (HIP GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Average height of the lateral protrusions of the right and the left greater femoral trochanters.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: BUTTOCK CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>98.60</u>	<u>8.48</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: Buttock Circumference is the preferred dimension since it assures the maximum circumferential measurement of this area of the body.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the consistency of landmark location; maintaining the tape in the desired plane owing to buttock curvature.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIP CIRCUMFERENCE AT TROCHANTERION OVER FOUNDATION GARMENT  
(HIP GIRTH OVER FOUNDATION GARMENT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips over a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Indeterminable-not clearly defined in the report.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>*98.55</u>	<u>8.53</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: very few Army women wear foundation garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the type of foundation garment worn.

\*When the subject did not wear a foundation garment, the corresponding skin measurement was substituted in the data analysis.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP CIRCUMFERENCE 7 INCHES BELOW WAIST

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips measured 7 inches below the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): 7 inches below waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	93.64	5.59	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller hips than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP CIRCUMFERENCE 7 INCHES BELOW WAIST OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips measured 7 inches below the level of the waist of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): 7 inches below waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	93.71	5.65	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE

US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: US Army '66           

US Army '77           

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and           

FEMALE            and           

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ IN WHAT WAY?           

GENDER SENSITIVE? YES ☐ NO ☐

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:           

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the type of foundation garment worn.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP CIRCUMFERENCE 9 INCHES BELOW WAIST

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips measured 9 inches below the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): 9 inches below waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	95.27	6.02	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller hips than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HIP CIRCUMFERENCE 9 INCHES BELOW WAIST OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the hips measured 9 inches below the level of the waist of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): 9 inches below the level of the waist (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	95.30	5.83	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: 

US Army '66	
US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE		and	
FEMALE		and	

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO the definition of waist level; the type of foundation garment worn.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIP HEIGHT (AT TROCHANTER)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of the hips.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Average height of the lateral points of the right and left greater femoral trochanters.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: BUTTOCK HEIGHT

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>80.29</u>	<u>4.52</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: Buttock Height is the preferred dimension for the design and sizing of garments and for the construction of clothing manikins. Since Buttock Circumference ensures the greatest circumference of this body area, Buttock Height is the more appropriate dimension.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of the landmarks.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: HIP-WAIST LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance along the side of the waist and the side of the hip.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Waist level (average height of the inferior margins of the 12th ribs); hip level (average height of the most lateral points of the right and left greater femoral trochanters); hip-level line (one-half the distance between the posterior projection of a buttock and the anterior projection of a thigh).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD
BUREAU OF HOME ECONOMICS	<u>22.94</u>	<u>2.39</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of the landmarks.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: HUMERAL EPICONDYLE BREADTH, RIGHT AND LEFT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum distance across the bony prominences of the elbow.
2. BODY POSITION: Standing; arm perpendicular to the body; elbow flexed 90 degrees.
3. LANDMARK(S): Medial and lateral humeral epicondyles.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	Right	$\bar{X}$	SD	SURVEY	Right	$\bar{X}$	SD
1 AF Women '68		<u>6.13</u>	<u>0.31</u>	4 USAF '67		<u>7.08</u>	<u>0.36</u>
2 Army Women '77		<u>      </u>	<u>      </u>	5 US Army '66		<u>      </u>	<u>      </u>
3 USN '64		<u>      </u>	<u>      </u>	6 Army Av. '70		<u>7.15</u>	<u>0.33</u>
	Left				Left		
AF Women '68		<u>6.10</u>	<u>0.31</u>	USAF '67		<u>7.10</u>	<u>0.35</u>

C. CORRELATION WITH:      STATURE      WEIGHT      AGE  
                                  US Army '66                                      
                                  US Army '77                                    

COEFFICIENT OF VARIATION: US Army '66         
                                  US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE        and         
    FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a measure of skeletal mass used only in assessing body composition.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☐    NO ☒  
                                  IN WHAT WAY?

G. REPRODUCIBILITY:    A ☐    B ☐    C ☒

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating and maintaining the caliper on the landmarks.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: ILIOCRISTALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the crest of the pelvis.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Iliocristale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	109.15	4.80
2 Army Women '77	_____	_____	5 US Army '66	106.33	5.37
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.804	.392	-.016

COEFFICIENT OF VARIATION: US Army '66 5.1  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 93.6 and 119.2  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the development of anthropomorphic analogues used for high acceleration (including crash) research. This dimension has been used by the Army for the design and sizing of garments but Waist Height is the preferred dimension.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower ex. emities than Asians.

G. REPRODUCIBILITY. A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and consistency of locating the landmark.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: ILIOCRISTALE HEIGHT [HÖHE DES DARMBEINKAMMES (CRISTALHÖHE)]

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the highest point on the crest of the pelvis.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Iliocristale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>106.0</u>	<u>4.7</u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: used in this survey in conjunction with the bottom of the rib cage to define the level of the waist; useful only for the development of anthropomorphic analogues used for high acceleration (including crash) research. This dimension has been used by the Army for the design and sizing of garments but waist Height is the preferred dimension.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: the definition and consistency of locating the landmark.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INSTEP CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the instep.
2. BODY POSITION: Standing.
3. LANDMARK(S): Highest point of the arch of the foot.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	25.69	1.21
2 Army Women '77	23.48	1.25	5 US Army '66	26.56	1.65
3 USN '64			6 Army Av. '70	27.08	1.33

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		.375	.517	.027
	US Army '77	.462	.592	-.003

COEFFICIENT OF VARIATION:	US Army '66	6.2
	US Army '77	5.4

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	22.8	and	30.6
	FEMALE	20.8	and	26.8

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful only as one in a series of dimensions required for the development of shoe lasts.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have lower arches than Blacks. Among men and women of like body size, men tend on the average to have larger feet than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of the location of the landmark.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: INSTEP CIRCUMFERENCE (INSTEP-SOLE CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the instep.
2. BODY POSITION: CF-standing; RA, RAF-sitting.
3. LANDMARK(S): CF-metatarsale-cuneiform joint; RA, RAF-intermediate cuneiform (Cuneiform II).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of instep landmark.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>25.77</u>	<u>1.18</u>	RAA	<u>24.72</u>	<u>1.08</u>
FRC			RAF		
RA	<u>24.34</u>	<u>1.11</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: used only as one in a series of dimensions required for the development of lasts.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of the location of the landmark.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INTEROCULAR BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the inner corners of the eyes.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Endocanthia.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	3.33	0.28
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	3.21	0.29	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66 STATURE WEIGHT AGE  
US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design of eye-related items;  
useful as one in a series of dimensions required for the development of  
three-dimensional head and face forms used to guide the design and sizing  
of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the  
average to have broader faces than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: not a contact measurement; the distance from the  
landmarks that the tips of the sliding caliper are held.

## H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INTERPUPILLARY BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the center of the pupils.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Center of the pupils.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>6.27</u>	<u>0.36</u>
2 Army Women '77	<u>5.82</u>	<u>0.44</u>	5 US Army '66	<u>6.13</u>	<u>0.40</u>
3 USN '64	<u>6.51</u>	<u>0.28</u>	6 Army Av. '70	<u>5.90</u>	<u>0.35</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.138</u>	<u>.218</u>	<u>.128</u>
	US Army '77	<u>.179</u>	<u>.195</u>	<u>.054</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>6.5</u>
	US Army '77	<u>7.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>5.2</u>	and	<u>7.1</u>
	FEMALE	<u>4.8</u>	and	<u>6.9</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: required for the design of binocular optical devices; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites tend on the average to be smaller for this dimension than Blacks and Asians. Among men and women of like body size, men tend on the average to have broader faces than women.

## G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: not a contact measurement; the distance from the landmarks that the tips of the sliding caliper are held; the ability of the anthropometrist to sight accurately the landmarks; apprehension of subject and anthropometrist of measurements made close to the eyes.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: INTERPUPILLARY BREADTH (PUPILLENABSTAND)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the centers of the pupils.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Centers of the pupils.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>6.4</u>	<u>0.3</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the design of binocular optical devices; often required for developing a link system of the body; required for the development of anthropomorphic analogues; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the face.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: not a contact measurement; the distance from the landmarks that the tips of the sliding caliper are held; the ability of the anthropometrist to sight accurately the landmarks; apprehension of subject and anthropometrist of measurements made close to the eyes.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INTERSCYE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the back between the axillary folds.
2. BODY POSITION: Anthropometric standing except USAF '67-anthropometric sitting.
3. LANDMARK(S): USN '64, USAF '67, USAF '68, USA '77-posterior scye; USA '66-upper point of axillary folds; USA '77-midway between the upper point of the axillary folds and acromion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different landmarks used in USA '66 and USA '77.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>35.06</u>	<u>2.44</u>	4 USAF '67	<u>38.76</u>	<u>3.76</u>
2 Army Women '77	<u>37.85</u>	<u>2.34</u>	5 US Army '66	<u>39.10</u>	<u>3.16</u>
3 USN '64	<u>41.11</u>	<u>3.03</u>	6 Army Av. '70	<u>39.42</u>	<u>2.95</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.198</u>	<u>.535</u>	<u>.098</u>
US Army '77	<u>.276</u>	<u>.479</u>	<u>.079</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>8.1</u>
	US Army '77	<u>6.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 31.9 and 46.7  
FEMALE 32.4 and 43.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among White and Asian males of like body size, Whites tend on the average to have broader backs than Asians.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the definition and consistency of the location of the landmarks.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INTERSCYE FRONT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the chest between points established at the bottom of the axillary folds at a level midway between these points and the tip of the shoulders.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior scyes; acromia.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: ANTERIOR CHEST WIDTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>33.16</u>	<u>1.73</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.387</u>	<u>.567</u>	<u>.151</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 5.20

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 29.4 and 37.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: of marginal value if Chest Circumference at Scye, Anterior Bust/Chest Arc, Bustpoint/Thelion-Bustpoint/Thelion data are available.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Breast configuration affects this measurement.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of the landmarks.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: INTERSCYE FRONT (ANTERIOR CHEST WIDTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the chest between points established at the bottom of the axillary folds at a level midway between these points and the tip of the shoulder.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior scyes; acromia.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>31.67</u>	<u>2.29</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: of marginal value if Chest Circumference at Scye, Anterior Bust/Chest Arc, Bustpoint/Thelion-Bustpoint/Thelion data are available.

E. REPRCDUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of the scye landmarks.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: INTERSCYE, MAXIMUM

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the backs of subjects with their arms fully extended, measured between points at the bottom of the axillary folds. These points are established when the subjects stand erect with their arms relaxed at their sides.
2. BODY POSITION: USN '64-sitting erect, arms extended forward horizontally as far as possible; USA '66, USA '70-standing erect, arms extended forward horizontally as far as possible; USAF '67, USAF '68-standing with torso fully flexed in a relaxed posture, arms hanging relaxed.
3. LANDMARK(S): Posterior scyes.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Body position of USAF subjects were very different from that of USN and USA subjects.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>49.39</u>	<u>3.29</u>	4 USAF '67	<u>61.54</u>	<u>3.02</u>
2 Army Women '77	<u>54.28</u>	<u>3.44</u>	5 US Army '66	<u>52.64</u>	<u>3.70</u>
3 USN '64	<u>54.28</u>	<u>3.44</u>	6 Army Av. '70	<u>55.89</u>	<u>3.45</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	<u>.293</u>	<u>.572</u>	<u>.118</u>	
	US Army '77	<u>      </u>	<u>      </u>	<u>      </u>

COEFFICIENT OF VARIATION: US Army '66 7.0  
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 43.7 and 61.6  
FEMALE        and       

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of landmark location; consistency of points of measurement on the distorted posterior scye landmarks; consistency of body position.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: KNEE CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the knee.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Midpatella.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>36.30</u>	<u>2.27</u>	4 USAF '67	<u>38.68</u>	<u>2.07</u>
2 Army Women '77	<u>34.82</u>	<u>2.24</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.419</u>	<u>.820</u>	<u>.168</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>6.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 30.2 and 40.8

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the tension of muscles affecting the patella.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: KNEE CIRCUMFERENCE AT TIBIALE

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The horizontal circumference of the knee at a level of the lower part of the knee.
2. BODY POSITION: Standing; feet parted a few centimeters.
3. LANDMARK(S): Tibiale.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: KNEE CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD
BUREAU OF HOME ECONOMICS	<u>35.46</u>	<u>3.23</u>
HES		
Men	_____	_____
Women	_____	_____
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: The level of this circumference is of marginal value for meeting the requirements for a measure of knee circumference.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the accuracy and consistency of locating the landmark.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: KNEE CIRCUMFERENCE, FULLY BENT (KNIEUMFANG BEI MAXIMALAR BEUGUNG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The oblique circumference of the fully bent knee encompassing the crease of the thigh/calf juncture and the most forward point of the knee.
2. BODY POSITION: FRG-standing; tightly flexed knee is on a platform while the other leg is on the standing surface; RA, RAF-squatting to fully flex the knees.
3. LANDMARK(S): Popliteal crease; anterior point of the knee.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>43.7</u>	<u>2.4</u>	RAF	<u>44.55</u>	<u>2.14</u>
RA	<u>43.58</u>	<u>2.44</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and lower-body utility garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the degree of knee flexion.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: KNEE CIRCUMFERENCE, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The oblique circumference of the knee of a seated subject.
2. BODY POSITION: Sitting; knees flexed 90 degrees.
3. LANDMARK(S): Mid-patella; popliteal crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	39.30	2.12
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: KNEE CIRCUMFERENCE, SITTING (BENT KNEE GIRTH)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The oblique circumference of the knee of a seated subject.
2. BODY POSITION: Sitting; knees flexed 90 degrees.
3. LANDMARK(S): Mid-patella; popliteal crease.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: KNEE CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>36.30</u>	<u>3.51</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: KNEE HEIGHT (MIDPATELLA HEIGHT) (KNEE CIRCUMFERENCE HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the knee.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Midpatella.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different locations of landmarks used.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	49.65	2.49
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66	_____	_____	_____
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of garments with knee pockets and knee pleats; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter calves than Blacks and longer calves than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of the landmark; stability of the landmark (subjects may lock their knee causing an upward movement of the patella by as much as 2 cm).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: KNEE HEIGHT (SUPRAPATELLA) (KNEECAP HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the standing surface to the top of the knee cap.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Suprapatella.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: KNEE HEIGHT (MIDPATELLA)

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>52.62</u>	<u>2.56</u>
2 Army Women '77	<u>47.90</u>	<u>2.65</u>	5 US Army '66	<u>52.86</u>	<u>3.25</u>
3 USN '64	<u>53.29</u>	<u>2.66</u>	6 Army Av. '70	<u>51.21</u>	<u>2.70</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.739</u>	<u>.334</u>	<u>-.002</u>
US Army '77	<u>.848</u>	<u>.426</u>	<u>.054</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>6.1</u>
	US Army '77	<u>5.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 45.5 and 60.7  
FEMALE 42.1 and 54.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Knee Height (Midpatella) is the preferred dimension since it is the level where Knee Circumference is generally measured.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, blacks, and Asians of like body size, Whites tend on the average to have shorter calves than Blacks and longer calves than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS

H. PARTICULARLY SENSITIVE TO: stability of landmark (subjects may lock knee causing an upward movement of the patella by as much as 2 cm).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: KNEE HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from a foot support to the top of the knee of a seated subject.
2. BODY POSITION: Sitting erect; knees flexed 90 degrees; thighs parallel.
3. LANDMARK(S): USN '64, USA '66- "top of the knee"; USAF '67-superior margin of the patella of a standing subject; USA '70, USA '77-5 cm proximal to suprapatella on a seated subject.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different landmarks used.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	55.76	2.49
2 Army Women '77	50.99	2.60	5 US Army '66	54.06	2.37
3 USN '64	55.50	2.48	6 Army Av. '70	53.00	2.56

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.788	.501	.004
			.857	.546	.041

COEFFICIENT OF VARIATION:	US Army '66	5.1
	US Army '77	5.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	47.7	and	60.6
	FEMALE	45.5	and	57.3

D. THOUGHT TO BE OF Essential, Use' 1, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required as a seated clearance dimension; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter calves than Blacks and longer calves than Asians.

G. REPRODUCIBILITY. A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of the landmark.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: KNEE HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the top of the knee of a seated subject.
2. BODY POSITION: Sitting erect; knees flexed 90 degrees; thighs parallel.
3. LANDMARK(S): 7.50 cm. proximal to vertical plate touching the patella.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>55.89</u>	<u>2.54</u>
RA	<u>54.74</u>	<u>2.48</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces; required as a seated clearance dimension; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of the landmark.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: KNEE HEIGHT, SITTING

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The vertical distance between a foot support and the top of the knee just behind the kneecap.
2. BODY POSITION: Sitting erect; knees flexed 90 degrees; heels and knees together.
3. LANDMARK(S): Immediately proximal to the patella.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>54.50</u>	<u>2.86</u>
Women	<u>49.92</u>	<u>2.66</u>
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: required for the design and layout of seated workspaces; required as a seated clearance dimension; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of the landmark.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: KNEE-KNEE BREADTH, CLOSED (KNIEBREITE, GESCHLOSSEN)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the knees held together.
2. BODY POSITION: Sitting; knees together and flexed 90 degrees; feet together.
3. LANDMARK(S): Lateral point on the head of each fibula.
4. INSTRUMENTS/EQUIPMENT: Body caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: THIGH-THIGH BREADTH, SITTING

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>21.1</u>	<u>1.6</u>	RAF		
RA					

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: Thigh-Thigh Breadth is the preferred dimension.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the force of contact between the knees.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: KNEE-KNEE BREADTH, OPEN (KNIEBREITE, GEOFFNETE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the spread of the relaxed knees.
2. BODY POSITION: Sitting; feet together and flat on floor; knees abducted to a relaxed, not forced, position.
3. LANDMARK(S): Lateral point of each fibula.
4. INSTRUMENTS/EQUIPMENT: Body caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>38.7</u>	<u>4.8</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: can be a useful clearance dimension for the design of confined seated workspaces, but the consistency of subject position is believed to be highly variable.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the degree of relaxation.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LATERAL MALLEOLUS HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most prominent point on the outside of the ankle bone.
2. BODY POSITION: Standing on table.
3. LANDMARK(S): Lateral point of lateral malleolus.
4. INSTRUMENTS/EQUIPMENT: Measuring block.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	6.77	0.59	4 USAF '67	7.04	0.54
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system; useful for the design and sizing of over-the-ankle footwear; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GEND<sup>R</sup> SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency and accuracy of locating the landmark; the angle from which the arthropometrist views the measuring block.

H. PARTICULARLY SENSITIVE TO.

## ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LIP LENGTH

**A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:**

1. DESCRIPTION: The horizontal distance between the corners of the mouth.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Chelia.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>4.38</u>	<u>0.42</u>	4	USAF '67	<u>5.23</u>	<u>0.37</u>
2	Army Women '77	<u>          </u>	<u>          </u>	5	US Army '66	<u>          </u>	<u>          </u>
3	USN '64	<u>5.14</u>	<u>0.43</u>	6	Army Av. '70	<u>          </u>	<u>          </u>

		STATURE	WEIGHT	AGE
C. CORRELATION WITH:	US Army '66	_____	_____	_____
	US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have smaller mouths than Blacks.

G. REPRODUCIBILITY:    A ☐    B ☐    C ☒

IF B OR C, THE PROBLEM IS: consistency of landmark interpretation;  
subjects' variability in positioning lips.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LIP LENGTH, SMILING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the corners of the mouth of a broadly smiling subject.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Chelia.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>5.88</u>	<u>0.56</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.029</u>	<u>.183</u>	<u>.103</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 9.51

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 4.70 and 7.10

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: used to establish the maximum clearance for the inner seal of a respirator or oxygen mask.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have smaller mouths than Blacks.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of degree of smile within and between subjects.

## H. PARTICULARLY SENSITIVE TO.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LIP PROTRUSION-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the plane of the back of the head and the most forward point of the lips.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Anterior lip point; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: STOMION-WALL

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	19.30	1.06	4 USAF '67	21.16	0.86
2 Army Women '77			5 US Army '66		
3 N '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have less prognathism and lip eversion than Blacks.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LIP-LIP HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum vertical distance between the upper and lower borders of the closed mouth.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Inferior point of the lower lip; superior point of the upper lip.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	1.73	0.38
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	1.66	0.36	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66	_____	_____	_____
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have less full and everted lips than Blacks.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of interpretation of the landmarks;  
consistency of jaw position.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: LOWER THIGH CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the thigh at a level just above the knee.
2. BODY POSITION: Standing erect; feet slightly apart.
3. LANDMARK(S): USN '64-distal to lateral vastus muscle; USA '66, USA '70-proximal to suprapatella.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77			5 US Army '66	<u>40.36</u>	<u>3.87</u>
3 USN '64	<u>40.58</u>	<u>3.00</u>	6 Army Av. '70	<u>39.32</u>	<u>3.09</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.201</u>	<u>.681</u>	<u>.085</u>
US Army '77			

COEFFICIENT OF VARIATION:	US Army '66	<u>9.6</u>
	US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 32.7 and 49.9  
FEMALE            and           

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of locating the landmark.

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MAXIMUM MENTAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal distance between the bony ends of the brow ridges
2. BODY POSITION: Sitting.
3. LANDMARK(S): Lateral point of the right and of the left supraorbital ridge.
4. INSTRUMENTS/EQUIPMENT: Spreading caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	11.60	0.46
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	12.26	0.71	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66            STATURE            WEIGHT            AGE             
US Army '77           

COEFFICIENT OF VARIATION: US Army '66             
US Army '77           

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE            and           

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have wider faces than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: identifying the landmarks and maintaining the tips of the caliper on the landmarks.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: MAXIMUM THIGH CIRCUMFERENCE (MAXIMUM THIGH GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the thigh.
2. BODY POSITION: Standing erect; feet parted a few centimeters.
3. LANDMARK(S): Level of maximum circumference of the thigh.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: THIGH CIRCUMFERENCE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>56.49</u>	<u>5.72</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: (Upper) Thigh Circumference and Lower Thigh Circumference describe adequately the circumference of the thigh.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: MEDIAL MALLEOLUS CIRCUMFERENCE (ANKLE CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the ankle at the level of the greatest protrusion of the inside ankle bone.
2. BODY POSITION: Sitting with knees flexed 90 degrees.
3. LANDMARK(S): Medial point of the medial malleolus.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>23.65</u>	<u>1.70</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the development of over-the-ankle foot gear; marginal for the design and sizing of single- and lower-body garments; marginal for the construction of clothing manikins.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MEDIAL MALLEOLUS HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most projecting point of the inside ankle bone.
2. BODY POSITION: Standing on table. .
3. LANDMARK(S): Medial point of medial malleolus.
4. INSTRUMENTS/EQUIPMENT: Measuring block.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

### B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	8.57	0.57
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of over-the-ankle foot wear.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating the landmark, the angle from which the anthropometrist views the measuring instrument.

H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: MEDIAL MALLEOLUS HEIGHT (ANKLE HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the most protruding point of the inside ankle bone.
2. BODY POSITION: Standing.
3. LANDMARK(S): Medial point of the medial malleolus.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>7.57</u>	<u>0.71</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of over-the-ankle foot gear.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating the landmark, the angle from which the anthropometrist views the measuring instrument.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MENTON-CRINION LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the inferior tip of the chin and the hairline.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; crinion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>17.58</u>	<u>0.83</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.220</u>	<u>.268</u>	<u>.047</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 15.6 and 19.5  
FEMALE 15.6 and 19.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for specifying the placement of the sealing edge of full-face respirators; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Men often have receding hairlines; women rarely do.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of locating the landmarks.

H. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MENTON-SELLION LENGTH (FACE LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tip of the chin and the deepest depression of the nasal root.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; sellion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: MENTON-TOP OF HEAD minus SELLION TOP OF HEAD

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>10.63</u>	<u>0.61</u>	4 USAF '67	<u>12.03</u>	<u>0.61</u>
2 Army Women '77	<u>10.69</u>	<u>0.57</u>	5 US Army '66	<u>12.03</u>	<u>0.66</u>
3 USN '64			6 Army Av. '70	<u>11.32</u>	<u>0.67</u>

C. CORRELATION WITH:	STATURE	HEIGHT	AGE
US Army '66	<u>.302</u>	<u>.286</u>	<u>.045</u>
US Army '77	<u>.366</u>	<u>.322</u>	<u>.028</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.5</u>
	US Army '77	<u>5.3</u>

1st and 99th, US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>10.5</u>	and	<u>13.6</u>
	FEMALE	<u>9.6</u>	and	<u>12.0</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of equipment worn on the face; required as one in a series of dimensions used for the development of three-dimensional face forms used to guide the design of equipment worn on the face; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have longer faces than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO the definition and consistency of locating menton; the pressure used on the caliper.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: MENTON-SELLION LENGTH (FACE LENGTH)  
(MENTON-NASAL ROOT DEPRESSION) (MORPHOLOGISCHE GESICHTSHÖHE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tip of the chin and the deepest depression of the nasal root.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; sellion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>12.31</u>	<u>0.64</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>11.8</u>	<u>0.6</u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension required for the design, sizing, procurement and issuing of equipment worn on the face; required as one in a series of dimensions used for the development of three-dimensional head and face forms used to guide the design of equipment worn on the face; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and consistency of locating menton; the pressure used on the caliper.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MENTON-SUBNASALE LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the tip of the chin to the juncture of the nose with the upper lip.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Menton; subnasale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: VERTEX-MENTON minus VERTEX-SUBNASALE

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>5.54</u>	<u>0.51</u>	4 USAF '67	<u>6.90</u>	<u>0.53</u>
2 Army Women '77	<u>      </u>	<u>      </u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>7.02</u>	<u>0.59</u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the face; useful with Menton-Sellion Length as an expression of facial proportion.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger faces than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of locating menton; compression of the tissue at both landmarks.

H. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MENTON-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the tip of the chin and the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Menton; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>21.91</u>	<u>1.14</u>	4 USAF '67	<u>22.79</u>	<u>1.02</u>
2 Army Women '77	<u>20.88</u>	<u>1.0</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.031</u>	<u>.279</u>	<u>.073</u>

COEFFICIENT OF VARIATION: US Army '66	<u>          </u>
US Army '77	<u>4.9</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 16.7 and 23.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger faces than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; the consistency of locating menton.

H. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: MENTON-TOP OF HEAD (MENTON-VERTEX)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the chin and the plane of the top of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Menton; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRC	_____	_____	RAF	<u>22.95</u>	<u>1.01</u>
RA	<u>22.31</u>	<u>..10</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the development of anthropomorphic analogues; useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; the consistency of locating menton.

## F. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MENTON-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tip of the chin and the plane of the back of the head.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Menton; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CHIN PROMINENCE-WALL

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>18.23</u>	<u>1.14</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>19.47</u>	<u>1.10</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.192</u>	<u>.340</u>	<u>.039</u>

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77 <u>5.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 17.2 and 22.4

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have greater head lengths than women and greater distances between facial features and the back plane of the head (usually greater by more than one SD). Although the data here do not support the identification of this dimension as Gender Sensitive, these are probably reflecting differences in definition and interpretation of menton.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; the consistency of locating menton.

H. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: MENTON-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tip of the chin and the plane of the back of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Menton; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: CHIN PROMINENCE-WALL

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>19.98</u>	_____
RA	<u>19.75</u>	<u>1.22</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; the consistency of locating menton.

F. PARTICULARLY SENSITIVE TO: the definition of menton.

# ANTHROPOMETRIC SURVEY OF U.S. MILITARY PERSONNEL

VARIABLE NAME: METACARPALE III HEIGHT (KNUCKLE HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the knuckle of the third finger.
2. BODY POSITION: Standing; arms and hands extended at sides.
3. LANDMARK(S): Phalangion III.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: GRIP AXIS HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>70.99</u>	<u>3.97</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.823</u>	<u>.484</u>	<u>.216</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>5.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 61.9 and 79.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Grip Axis Height is the preferred dimension.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: arm and shoulder position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MID-SHOULDER HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the sitting surface to a point on the shoulder midway between the side of the base of the neck and the tip of the shoulder.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Lateral neck point (neck circumference plane: USA '70- inferior to thyroid cartilage perpendicular to long axis of the neck; USAF '67- over anterior point of the thyroid cartilage perpendicular to long axis of the neck; USAF '68- neck/shoulder juncture perpendicular to long axis of the neck; USA '77- neck/shoulder juncture not perpendicular to long axis of neck); acromion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: different landmarks used to define the neck plane.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	58.0	2.66	4 USAF '67	64.59	2.74
2 Army Women '77			5 US Army '66	62.38	3.18
3 USN '64			6 Army Av. '70	62.90	2.76

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGF	SIT.HT.
			.640	.410	.016	.859
			.716	.490	.134	.881

COEFFICIENT OF VARIATION: US Army '66 5.1  
US Army '77

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 54.5 and 69.7  
FEMALE  and

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces, particularly with regard to seat restraint systems; essential for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have longer torsos than Blacks and shorter torsos than Asians.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of the landmark location.

H. PARTICULARLY SENSITIVE TO: definition of neck plane.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: MID-SHOULDER HEIGHT, SITTING (SHOULDER HEIGHT, SITTING)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:64

1. DESCRIPTION: The vertical distance between the top of the shoulder near the base of the neck.
2. BODY POSITION: Sitting erect; shoulders relaxed.
3. LANDMARK(S): 9.0 cm. medial to acromion on top of the shoulder.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: MID-SHOULDER HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	<u>65.21</u>	<u>2.57</u>
FRG	_____	_____	RAF	<u>66.57</u>	<u>2.67</u>
RA	<u>64.77</u>	<u>3.00</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the design and sizing of seat restraint systems; essential for the development of anthropomorphic analogues; useful for the design and layout of seated workspaces.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of the landmark location.

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: MIDTHIGH CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the midthigh.
2. BODY POSITION: Standing erect; feet parted a few centimeters.
3. LANDMARK(S): One-half of the distance between the lateral point of the greater trochanter of the femur and tibiale.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>49.71</u>	<u>5.16</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: (Upper) Thigh Circumference and Lower thigh Circumference adequately describe the circumference of the thigh.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: accuracy and consistency of locating the landmark.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MINIMUM FRONTAL ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the greatest indentations of the crests rising upwards from the outer part of the eyebrows.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Frontotemporales.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	13.60	0.79
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66	_____	_____	_____
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of locating the landmarks (they are difficult to locate precisely on many subjects).

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: MINIMUM FRONTAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The minimum horizontal distance between the crests rising upwards from the the outer part of the eyebrows.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Frontotemporales.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	<u>11.05</u>	<u>0.49</u>
2 Army Women '77	<u>10.52</u>	<u>0.51</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.259</u>	<u>.351</u>	<u>.086</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.9</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE		and	
	FEMALE	<u>9.5</u>	and	<u>11.8</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of locating the landmarks;  
maintaining the tips of the caliper on the landmarks.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: MINIMUM FRONTAL BREADTH (KLEINSTE STIRNBREITE)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The minimum horizontal distance between the crests rising upwards from the outer part of the eyebrows.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Frontotemporales.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>11.30</u>	<u>0.50</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of locating the landmarks; maintaining the tips of the caliper on the landmarks.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: NASAL BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The breadth of the nose at the level of the maximum flare of the nostrils.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Alares.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>3.19</u>	<u>0.33</u>	4 USAF '67	<u>3.54</u>	<u>0.29</u>
2 Army Women '77	<u>3.41</u>	<u>0.45</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>3.54</u>	<u>0.26</u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>-.031</u>	<u>.112</u>	<u>.130</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>13.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 2.6 and 4.6

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have lesser nasal breadths than Blacks and greater nasal breadths than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: Tissue compression.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: NASION-TOP OF HEAD (NASION-VERTEX)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the nasion and the top of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Nasion; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: SELLION-TOP OF HEAD

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG			RAF	<u>10.63</u>	<u>0.96</u>
RA	<u>10.43</u>	<u>1.07</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: Sellion-Top of Head is the preferred dimension since sellion provides a slightly more functional measure and it is much easier to locate precisely than nasion.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; nasion is often difficult to locate precisely on many subjects.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: NECK CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the neck perpendicular to its long axis.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): USN '64, USA '66, USA '70-inferior to thyroid cartilage; USAF '67-anterior point of the thyroid cartilage.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Definition of neck plane.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	38.34	1.91
2 Army Women '77			5 US Army '66	37.39	2.07
3 USN '64	38.46	1.84	6 Army Av. '70	37.75	2.00

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.238	.719	.234

COEFFICIENT OF VARIATION:	US Army '66	5.5
	US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 33.0 and 42.6  
FEMALE  and

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement, and issuing of garments with close fitting collars; required for the construction of clothing manikins; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of neck plane.



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: NECK CIRCUMFERENCE (HALSUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the neck perpendicular to its long axis.
2. BODY POSITION: Anthropometric standing or anthropometric sitting.
3. LANDMARK(S): CF, FRG, RAA-anterior point of thyroid cartilage; RA, RAF-"immediately below the larynx."
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of the neck plane.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>39.55</u>	<u>2.24</u>	RAA	<u>38.46</u>	<u>2.18</u>
FRG	<u>37.9</u>	<u>1.9</u>	RAF	<u>38.15</u>	<u>1.69</u>
RA	<u>38.19</u>	<u>1.93</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of garments; required for the construction of clothing manikins; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of the neck plane.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: NECK CIRCUMFERENCE (BASE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the base of the neck.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): USAF '68-neck plane (perpendicular to the long axis of the neck at the neck/shoulder juncture); USA '77-neck plane at the neck/shoulder juncture (not perpendicular to the long axis of the neck).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Difference between the plane of measurement.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>33.75</u>	<u>1.68</u>	4	USAF '67	<u>          </u>	<u>          </u>
2	Army Women '77	<u>32.35</u>	<u>1.57</u>	5	US Army '66	<u>          </u>	<u>          </u>
3	USN '64	<u>          </u>	<u>          </u>	6	Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.359</u>	<u>.649</u>	<u>.068</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>4.90</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 29.10 and 36.30

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of open neck garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS. the consistency of establishing the neck plane.

H. PARTICULARLY SENSITIVE TO: the definition of the neck plane.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: NECK CIRCUMFERENCE (BASE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the base of the neck.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Cervicale; medial extremity of each clavicle.
4. INSTRUMENTS/EQUIPMENT: Fine chain; anthropometer (used to measure the chain).
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>38.79</u>	<u>2.36</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of open-neck garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the definition and establishment of the base of the neck plane (cervicale is difficult to locate precisely on many subjects).

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: NECK-BUSTPOINT LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the side of the base of the neck and the most prominent point of the bust.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): USA '77- lateral neck point [neck level established by placing a thin chain around the neck at its juncture with the shoulders (the plane is not perpendicular with the long axis of the neck)]; USAF '68- lateral neck point (neck level established by adjusting a Texas tie around the neck at its juncture with the shoulders in a plane perpendicular to the long axis of the neck).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>25.49</u>	<u>1.89</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>25.28</u>	<u>2.08</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.276</u>	<u>.569</u>	<u>.156</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>8.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 21.0 and 30.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of the neck level; the point of respiration at which the measurement is taken; the type and fit of the bra.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: NECK-BUSTPOINT LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the side of the base of the neck and the most prominent point of the bust.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Intersection of the lateral base of the neck (medial extremities of the clavicles and cervicale) and shoulder line [corresponding to the shoulder seam that originates at the lateral base of the neck (the circumference passing across cervicale and each clavicle) at the border of the trapezius, is directed towards acromion, and terminates at its intersection with the scye at the shoulder]; greatest protrusion of the bust.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>28.02</u>	<u>3.81</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design, sizing, procurement and issuing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of neck level; the point of respiration at which the measurement is taken; the type and fit of bra (a bandeau was used in this survey).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: NOSE PROTRUSION

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the base of the nasal septum and the maximum forward protrusion of the nose.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Subnasale; pronasale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: PRONASALE-WALL minus SUBNASALE-WALL

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	<u>2.29</u>	<u>0.25</u>	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for providing accommodation for the nose in equipment worn on the face; useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites tend on the average to have greater protrusion of the nose than Blacks and Asians. Among men and women of like body size, men tend on the average to have larger and more protrusive noses than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: a very difficult measurement to take without unduly compressing the tissue.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: PALM LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the wrist and the base of the middle finger.
2. BODY POSITION: Hand and fingers fully extended; fingers together.
3. LANDMARK(S): Wr'st (USAF '67-stylian; USA '66, USA '70, USA '77-distal wrist crease); crease at the base of digit III.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	10.83	0.54
2 Army Women '77	9.88	0.52	5 US Army '66	10.59	0.63
3 USN '64			6 Army Av. '70	10.95	0.55

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.489	.344	.015
			.585	.340	.044

COEFFICIENT OF VARIATION:	US Army '66	5.9
	US Army '77	5.3

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 10.8 and 12.2  
FEMALE 10.8 and 12.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of sizing system programs for gloves; useful for the development of a body-link system; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have shorter palms than Blacks. Among men and women of like body size, men tend on the average to have larger hands than women.

G. PROBLEMS: A ☐ B ☐ C ☒

IF OR THE PROBLEM IS consistency of hand and finger extension, location of wrist landmark locations.

H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: PALM LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the wrist and the base of the third finger.
2. BODY POSITION: Hand and fingers fully extended; fingers together.
3. LANDMARK(S): Wrist (first major skin crease proximal to the base of the hypothenar eminence); skin fold at the junction of digit III.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	<u>10.93</u>	<u>0.54</u>
FRG	_____	_____	RAF	_____	_____
RA	_____	_____			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of sizing systems/programs for gloves; useful for the development of a body-link system; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of hand and finger extension;  
consistency of wrist landmark location.

## F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: PENALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the upper edge of the juncture of the penis with the abdomen.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Penale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	<u>88.96</u>	<u>4.24</u>	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
 US Army '77                     

COEFFICIENT OF VARIATION: US Army '66         
 US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
 FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: Useful only for establishing the height of urinals and for placing waste elimination ports in full-body protective equipment. Adequate data are available for this purpose.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: subject modesty.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: PHILTRUM LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The height of the groove (philtrum) which runs vertically from the upper edge of the upper lip to the bottom of the nose.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Labrale superius; subnasale.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	1.55	0.28
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: a small dimension with considerable variability owing to compression of soft tissue.

H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: POPLITEAL HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the floor and the underside of the knee of a seated subject.
2. BODY POSITION: Sitting; knees flexed 90 degrees.
3. LANDMARK(S): Tendon of the biceps femoris.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>41.05</u>	<u>1.86</u>	4 USAF '67	<u>43.70</u>	<u>2.25</u>
2 Army Women '77	<u>41.68</u>	<u>2.35</u>	5 US Army '66	<u>44.61</u>	<u>2.50</u>
3 USN '64	<u>43.98</u>	<u>2.18</u>	6 Army Av. '70	<u>42.33</u>	<u>2.46</u>

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army '66		<u>.647</u>	<u>.166</u>	<u>-.104</u>
US Army '77		<u>.847</u>	<u>.401</u>	<u>.001</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.6</u>
	US Army '77	<u>5.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 38.9 and 50.5  
FEMALE 36.4 and 47.3

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter calves than Blacks and longer calves than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the amount of instrument pressure exerted on the tendon.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: POPLITEAL HEIGHT  
(LÄNGE DES UNTERSCHENKELS MIT FUSS) (SITZFLÄCHENHÖHE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the floor and the underside of the knee of a seated subject.
2. BODY POSITION: Sitting; knees flexed 90 degrees.
3. LANDMARK(S): Tendon of biceps femoris.
4. INSTRUMENTS/EQUIPMENT: FRG-anthropometer; RAA-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	<u>44.51</u>	<u>2.13</u>
FRG	<u>45.4</u>	<u>2.5</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the amount of instrument pressure exerted on the tendon.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: POSTERIOR CHEST BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance across the back between the juncture of the upper arms and the torso at a level about midway between the back of the base of the neck and the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): The right and the left posterior scye; spine of 7th thoracic vertebra.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: INTERSCYE

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>34.01</u>	<u>3.10</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: identification of the spine of the 7th thoracic vertebra (it is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: POSTERIOR CROTCH LENGTH  
(SCROTAL-POSTERIOR WAIST LEVEL CURVATURE OVER BUTTOCK)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the scrotum/perineal juncture passing over the posterior point of the buttock and the level of the back of the waist above the buttock.
2. BODY POSITION: Standing erect; feet slightly apart.
3. LANDMARK(S): Scrotale (crotch center); waist level (omphalion).
4. INSTRUMENTS/EQUIPMENT: unique metal block with tapes attached.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	42.63	3.02
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
US Army '77                     

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among White and Black males of like body size, Whites tend on the average to have larger buttocks than Blacks. Among men and women of like body size, men tend on the average to have smaller buttocks than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of the subject placing the special block on scrotale.

H. PARTICULARLY SENSITIVE TO: subject modesty.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: POSTERIOR NECK LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the back of the base of the head and the base of the neck.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): \*Inion; cervicale.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE MEASUREMENTS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	13.25	1.69
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the difficulty of locating inion precisely on many subjects (particularly women); cervicale is difficult to locate precisely on many subjects.

H. PARTICULARLY SENSITIVE TO:

\*Nuchale is the preferred landmark although it is also difficult to locate with consistency since there is more than the usual degree of subjectivity with its location.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: PRONASALE-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the tip of the nose to the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Pronasale; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>14.76</u>	<u>1.17</u>	4 USAF '67	<u>14.74</u>	<u>1.10</u>
2 Army Women '77	<u>13.55</u>	<u>0.99</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.234</u>	<u>.179</u>	<u>.106</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>7.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 11.4 and 15.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: PRONASALE-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the top of the nose to the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Pronasale; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: USN '64, USA '66-beam caliper; USAF '67, USAF '68, USA '77-headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>21.19</u>	<u>0.96</u>	4 USAF '67	<u>22.68</u>	<u>0.75</u>
2 Army Women '77	<u>21.49</u>	<u>0.98</u>	5 US Army '66	<u>22.19</u>	<u>0.83</u>
3 USN '64	<u>22.85</u>	<u>0.76</u>	6 Army Av. '70	<u>22.65</u>	<u>0.78</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.297</u>	<u>.297</u>	<u>.12'</u>
			<u>.336</u>	<u>.381</u>	<u>.092</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>3.7</u>
	US Army '77	<u>4.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 20.2 and 24.1  
FEMALE 19.4 and 24.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger heads than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: PUPIL-TOP OF HEAD (PUPIL-VERTEX)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the center of the pupil and the plane of the top of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Center of pupil; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: EXTERNAL CANTHUS-TOP OF HEAD

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG			RAF	<u>11.26</u>	<u>0.82</u>
RA	<u>11.06</u>	<u>0.95</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

1. REASON FOR THE RATING IN C IS: required for the design of optical devices mounted on head gear, e.g. helmet mounted sights; required to derive Eye Height, Sitting from Sitting Height if the former is not measured (see Eye Height, Sitting); useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## F. PARTICULARLY SENSITIVE TO: subject's and anthropometrist's apprehension of measurements taken close to the eyes.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: RADIALE HEIGHT (ELBOW HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the elbow.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Radiale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 I'SAF '67	<u>112.29</u>	<u>4.57</u>
2 Army Women '77	<u>102.56</u>	<u>4.80</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.931</u>	<u>.579</u>	<u>.241</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 92.9 and 114.1  
FEMALE 92.9 and 114.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a useful dimension for the design and layout of workspaces; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO: shoulder and upper extremity position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: RADIALE-STYLION LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the elbow and the wrist parallel to the long axis of the forearm.

2. BODY POSITION: Standing.

3. LANDMARK(S): Radiale; stylium.

4. INSTRUMENTS/EQUIPMENT: Beam caliper.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>23.39</u>	<u>1.37</u>	4 USAF '67	<u>26.88</u>	<u>1.42</u>
2 Army Women '77	<u>24.37</u>	<u>1.47</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.689</u>	<u>.444</u>	<u>.055</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>6.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 21.2 and 27.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter forearms than Blacks and longer forearms than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SAGITTAL ARC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance from between the eyebrows and the base of the back of the neck.
2. BODY POSITION: Sitting.
3. LANDMARK(S): USA '70, USA '77, USAF '68, USN '64-glabella, nuchale; USAF '67-glabella; inion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different posterior landmarks used (nuchale preferred).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>34.79</u>	<u>1.49</u>	4 USAF '67	<u>36.64</u>	<u>1.66</u>
2 Army Women '77	<u>33.63</u>	<u>1.55</u>	5 US Army '66	<u>35.88</u>	<u>1.43</u>
3 USN '64	<u>36.90</u>	<u>2.18</u>	6 Army Av. '70	<u>35.88</u>	<u>1.43</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.313</u>	<u>.285</u>	<u>.043</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 30.6 and 38.2  
FEMALE 30.6 and 38.2

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design and sizing of equipment worn on the head.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating nuchale or inion.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SAGITTAL ARC (SAGITTALER KOPFBOGEN)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance from between the eyebrows and the base of the back of the neck.
2. BODY POSITION: Sitting.
3. LANDMARK(S): CF-glabella, nuchale; FRG-glabella, inion.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different posterior landmarks used (nuchale is preferred).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	36.44	1.98	RAA	_____	_____
FRG	33.2	1.4	RAF	_____	_____
RA	_____	_____			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head forms used to guide the design, sizing, procurement and issuing of equipment worn on the head.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the accuracy and consistency of locating nuchale or inion.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SCYE CIRCUMFERENCE (ARM SCYE CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the scye (a tailoring term denoting the line followed by the seam of a set-in sleeve).
2. BODY POSITION: Standing; arm slightly abducted.
3. LANDMARK(S): Anterior and posterior scye; acromion except for USAF '67.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USAF '67-a vertical measurement (the tape does not pass over acromion); USAF '67-tape snug; all others-light contact.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	37.10	2.29	4 USAF '67	48.36	2.79
2 Army Women '77	37.51	2.39	5 US Army '66	44.56	3.26
3 USN '64	44.93	2.67	6 Army Av. '70	44.00	2.57

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.271	.703	.239
			.373	.818	.190

COEFFICIENT OF VARIATION:	US Army '66	7.3
	US Army '77	6.4

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE  $\frac{37.7}{32.5}$  and  $\frac{53.8}{44.1}$   
FEMALE  $\frac{32.5}{44.1}$  and  $\frac{44.1}{53.8}$

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO: the definition and location of the scye; tissue compression.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SCYE CIRCUMFERENCE (ARMSCYE GIRTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the scye (a tailoring term denoting the line followed by the seam of a set-in sleeve).
2. BODY POSITION: Standing; arm slightly abducted.
3. LANDMARK(S): Midpoint of axilla; posterior scye; anterior scye; shoulder point. [Scye was established with a chalked string. The center of the string was placed under the arm when it was abducted about 30 degrees. The ends of the string crossed the top of the shoulder at shoulder point (midway between acromion and the superior point of the lateral end of the clavicle). Marks were made on the resulting chalk line at shoulder point and at anterior and posterior scye at the level of the fourth thoracic vertebrae.]
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>40.89</u>	<u>3.94</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition and location of the scye; tissue compression.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SCYE DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance on the spine between the base of the neck and the level of the juncture of the upper arm and the torso.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale; posterior scye.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>19.74</u>	<u>2.13</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the design of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition and location of the landmarks (cervicale is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SELLION-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the nasal root depression and the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Sellion; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	10.75	0.94
2 Army Women '77	10.06	0.93	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.156	.180	.081

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	9.3

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 8.0 and 12.1

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WH. C. 112?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SELLION-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the nasal root depression and the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Sellion; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: USN '64, USA '66-anthropometer; USAF '67, USAF '68, USA '70-headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	20.17	0.66
2 Army Women '77	19.13	0.96	5 US Army '66	19.10	0.72
3 USN '64	20.05	0.69	6 Army Av. '70	19.98	0.67

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	.273	.304	.103
US Army '77	.280	.361	.113

COEFFICIENT OF VARIATION:	US Army '66	3.8
	US Army '77	4.8

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 17.4 and 20.8  
FEMALE 17.1 and 22.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SHOULDER CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the shoulders.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Lateral points of the deltoid muscles.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>100.41</u>	<u>5.14</u>	4 USAF '67	<u>117.69</u>	<u>5.82</u>
2 Army Women '77	<u>100.36</u>	<u>5.35</u>	5 US Army '66	<u>113.16</u>	<u>6.39</u>
3 USN '64	<u>116.32</u>	<u>5.45</u>	6 Army Av. '70	<u>116.34</u>	<u>6.21</u>

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.297</u>	<u>.844</u>	<u>.201</u>
			<u>.331</u>	<u>.833</u>	<u>.138</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.6</u>
	US Army '77	<u>5.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 99.8 and 130.2  
FEMALE 89.4 and 113.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement, and issuing of single- and upper-body garments, particularly for unisex sizing programs; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to be larger for this dimension than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the position of the arms and shoulders; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SHOULDER CIRCUMFERENCE (SCHULTERUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal circumference of the shoulders.
2. BODY POSITION: Standing; shoulders retracted; arms relaxed at sides.
3. LANDMARK(S): Lateral points of the deltoid muscles.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>116.6</u>	<u>5.3</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: may be a key dimension for the design, sizing, procurement, and issuing of single- and upper-body garments, particularly for unisex sizing programs; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: position of the arms and shoulders; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SHOULDER LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the side of the base of the neck and the tip of the shoulder.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Acromion; USAF '68, USA '77-lateral point of neck circumference plane (USAF '68-neck/shoulder juncture perpendicular to the long axis of the neck; USA '77-neck/shoulder juncture not perpendicular to the long axis of the neck); USA '66, USAF '67, USA '70-lateral point of the neck/shoulder juncture.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Definition of landmarks.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>14.66</u>	<u>1.02</u>	4 USAF '67	<u>16.60</u>	<u>1.26</u>
2 Army Women '77	<u>15.00</u>	<u>1.06</u>	5 US Army '66	<u>16.20</u>	<u>1.98</u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>15.50</u>	<u>1.17</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.180</u>	<u>.195</u>	<u>.008</u>
	US Army '77	<u>.373</u>	<u>.247</u>	<u>.008</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>12.2</u>
	US Army '77	<u>7.1</u>

1st and 99th US ARMY '65 and '77 PERCENTILE VALUES:	MALE	<u>11.2</u>	and	<u>20.5</u>
	FEMALE	<u>12.5</u>	and	<u>17.7</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of locating acromion and, particularly, the lateral neck landmark. (Coefficients of variation for this dimension range from 6.5 to 12.2 cm.).

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SHOULDER LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance between the side of the base of the neck and a point on the top of the shoulder vertical to the axillary fold.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Origin and termination of the shoulder line. [Shoulder line corresponds to the shoulder seam that originates at the lateral base of neck circumference (the circumference passing across cervicale and each clavicle) at the border of the trapezius, is directed towards acromion, and terminates at its intersection with scye at the shoulder point (midway between acromion and the superior point of the lateral clavicle)].

4. INSTRUMENTS/EQUIPMENT: Tape.

5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>11.79</u>	<u>1.24</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of locating the landmarks.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SHOULDER-ELBOW LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the tip of the shoulder to the under side of the elbow bent 90 degrees.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Acromion; inferior point (in respect to the elbow bent 90 degrees) of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USN '64-definition of acromion.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	35.95	1.70
2 Army Women '77	33.56	1.75	5 US Army '66	36.87	1.86
3 USN '64	35.82	1.70	6 Army Av. '70	36.71	1.78

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		.741	.427	.056
	US Army '77	.808	.424	.070

COEFFICIENT OF VARIATION:	US Army '66	5.1
	US Army '77	5.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 32.6 and 41.3  
FEMALE 29.8 and 37.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: definition and location of acromion.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SHOULDER-WAIST LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the top of the shoulder and the waist passing over the greatest protrusion of the bust.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Shoulder line [corresponding to the shoulder seam that originates at the lateral base of the neck (the circumference passing across cervicale and each clavicle) at the border of the trapezius, is directed towards acromion, and terminates at its intersection with the scye (shoulder point) at the shoulder]; bust point; waist level.
4. INSTRUMENTS/EQUIPMENT: Tape.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>39.62</u>	<u>2.64</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition and location of waist level; point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SITTING HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the sitting surface to the top of the head.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	85.60	3.17	4 USAF '67	93.18	3.18
2 Army Women '77	85.08	3.59	5 US Army '66	90.69	3.66
3 USN '64	92.15	3.16	6 Army Av. '70	90.92	3.23

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.722	.393	-.054
			.767	.421	.075

COEFFICIENT OF VARIATION:	US Army '66	4.0
	US Army '77	4.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 82.0 and 99.2  
FEMALE 76.3 and 92.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a basic descriptor of body proportion; a key dimension for the design and layout of seated workspaces; a criterion for personnel selection for flight training and a measure of cockpit accommodation; required for the development of a body-link system; a key dimension for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have longer torsos than Blacks and shorter torsos than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SITTING HEIGHT (SITZHÖHE) (STAMMLÄNGE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the head.
2. BODY POSITION: CF, RA, RAA, RAF-anthropometric sitting; FRG-sitting erect with maximum stretch, head in the Frankfort plane.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: CF-anthropometer; RA, RAA-measuring rig; RAF-measuring rig (1) and anthropometer (2) (check of U.K. vs. U.S. measuring techniques).
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>90.26</u>	<u>3.37</u>	RAA	<u>91.08</u>	<u>3.18</u>		
FRG	<u>91.9</u>	<u>3.2</u>	RAF	(1) <u>93.60</u>	<u>3.10</u>	(2) <u>92.96</u>	<u>3.11</u>
RA	<u>91.13</u>	<u>3.41</u>					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a basic descriptor of body proportion; a key dimension for the design and layout of seated workspaces; a criterion for personnel selection for flight training and a measure of cockpit accommodation; required for the development of a body-link system; a key dimension for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SITTING HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the head.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>91.14</u>	<u>3.48</u>
Women	<u>85.48</u>	<u>3.25</u>
HANES		
Men	<u>92.23</u>	<u>3.85</u>
Women	<u>86.18</u>	<u>3.38</u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a basic descriptor of body proportion; a key dimension for the design and layout of seated workspaces; a criterion for personnel selection for flight training and a measure of cockpit accommodation; required for the development of a body-link system; a key dimension for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SITTING HEIGHT, RELAXED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the head of a subject sitting in a relaxed posture.
2. BODY POSITION: Sitting relaxed; head in the Frankfort plane.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	84.28	3.25	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: this dimension is of very limited engineering anthropometry use; in addition there are sufficient data to estimate adequately the difference between sitting height measured in the erect and relaxed body position.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have longer torsos than Blacks and shorter torsos than Asians.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of body position, i.e., degree of relaxation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SITTING HEIGHT, RELAXED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the head of a subject sitting in a relaxed posture.
2. BODY POSITION: Sitting "normally" relaxed; head in the Frankfort plane.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>86.86</u>	<u>3.54</u>
Women	<u>82.52</u>	<u>3.52</u>
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: this dimension is of very limited engineering anthropometry use; in addition, there are sufficient data to estimate adequately the difference between Sitting Height measured in the erect and relaxed body position.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of body position, i.e., degree of relaxation.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SITTING SPREAD CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum circumference of both thighs of the seated subject.
2. BODY POSITION: Sitting; thighs together; feet unsupported.
3. LANDMARK(S): Average greatest lateral protrusion of right and left thighs of seated subjects.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>98.09</u>	<u>9.93</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: There is no evidence that this dimension has been used in the design and sizing of military garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SITTING SPREAD HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of maximum thigh to thigh breadth as determined when the subject was seated.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Most lateral protrusion of the thighs (determined while the subject is sitting); popliteal area touching the edge of the sitting surface; feet unsupported.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: HIP HEIGHT

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>73.74</u>	<u>4.55</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: There is no evidence that this dimension has been used in the design and sizing of military garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: ABDOMINAL (SUPRAILIAC)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a fold of skin and subcutaneous tissue overlying the abdominal region.
2. BODY POSITION: Standing.
3. LANDMARK(S): 25 mm. lateral and 10 mm. superior to an anterior superior iliac spine.
4. INSTRUMENTS/EQUIPMENT: Harpenden Skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>0.86</u>	<u>0.35</u>
RA	<u>0.74</u>	<u>0.40</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a measure of nutritional status.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of landmark location; consistency of measuring technique.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: BICEPS

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a fold of skin and subcutaneous tissue overlying the biceps brachii muscle.
2. BODY POSITION: Standing.
3. LANDMARK(S): Anterior point of the flexed biceps.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>0.84</u>	<u>0.38</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.198</u>	<u>.673</u>	<u>.164</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 45.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE      and       
FEMALE 0.2 and 2.0

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat is also distributed differently in women and men.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of the location of the skinfold site;  
consistency of the measuring technique.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: BICEPS

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a fold of skin and subcutaneous tissue overlying the biceps brachii muscle.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): Level at one-half the distance between the lateral humeral epicondyle and acromion.
4. INSTRUMENTS/EQUIPMENT: Harpenden skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>        </u>	<u>        </u>	RAA	<u>        </u>	<u>        </u>
FRG	<u>        </u>	<u>        </u>	RAF	<u>0.52</u>	<u>0.21</u>
RA	<u>0.56</u>	<u>0.29</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a measure of nutritional status.

E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of the location of the skinfold site; consistency of the measuring technique.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: JUXTA-NIPPLE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a fold of skin and subcutaneous tissue overlying an area next to the nipple.
2. BODY POSITION: Standing.
3. LANDMARK(S): 1 cm lateral to thelion.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	1.36	0.67
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	1.18	0.49	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
 US Army '77                            

COEFFICIENT OF VARIATION: US Army '66         
 US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
 FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? This skinfold is not measured on women, owing to its poor relationship to the amount of body fat of women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the difficulty or impossibility of grasping a skinfold at this site; consistency of landmark location; consistency of measuring technique (this dimension has an unusually high coefficient of variation).

H. PARTICULARLY SENSITIVE TO:

## VARIABLE NAME: SKINFOLD: MEDIAL CALF

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying the inside of the calf.
2. BODY POSITION: Standing with one leg on platform; knee flexed about 90 degrees.
3. LANDMARK(S): Medial surface of the calf at the level of its maximum circumference.
4. INSTRUMENTS/EQUIPMENT: USA '70-Lange skinfold caliper; USAF '68-Harpender skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

**B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:**

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>1.59</u>	<u>0.52</u>	4	USAF '67	<u>          </u>	<u>          </u>
2	Army Women '77	<u>          </u>	<u>          </u>	5	US Army '66	<u>          </u>	<u>          </u>
3	USN '64	<u>          </u>	<u>          </u>	6	Army Av. '70	<u>0.96</u>	<u>0.46</u>

C. CORRELATION WITH:		STATURE	WEIGHT	AGE
US Army	'66	_____	_____	_____
US Army	'77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat is deposited differently in men and women.

G. REPRODUCIBILITY:    A ☐    B ☒    C ☐

IF B OR C, THE PROBLEM IS: the difficulty of grasping an appropriately measurable skinfold at this site; consistency of location of landmark; consistency of measuring technique.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: MIDAXILLARY LINE AT XIPHOID

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying a site on the torso at the level of the bottom of the breast bone.
2. BODY POSITION: Standing relaxed.
3. LANDMARK(S): Mid-axillary line; inferior point of the xiphoid.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	1.21	0.57
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH:      STATURE      WEIGHT      AGE  
                                  US Army '66      \_\_\_\_\_  
                                  US Army '77      \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66      \_\_\_\_\_  
                                  US Army '77      \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE \_\_\_\_\_ and \_\_\_\_\_  
    FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS:    a measure of nutritional status.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☒    NO ☐  
     IN WHAT WAY?    Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:    the consistency of the location of the skinfold site; the consistency of the measuring technique.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: SUBSCAPULAR

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue just below the tip of the shoulder blade.
2. BODY POSITION: Standing.
3. LANDMARK(S): Just distal to the inferior point of the scapula.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>1.29</u>	<u>0.48</u>	4 USAF '67	<u>1.37</u>	<u>0.53</u>
2 Army Women '77	<u>1.40</u>	<u>0.61</u>	5 US Army '66	<u>1.46</u>	<u>0.60</u>
3 USN '64	<u>1.40</u>	<u>0.49</u>	6 Army Av. '70	<u>1.46</u>	<u>0.60</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.089</u>	<u>.647</u>	<u>.148</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>43.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	and
	FEMALE	<u>0.6</u> and <u>3.1</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site; consistency of measuring technique.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: SUBSCAPULAR

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying the area just below the shoulder blade.
2. BODY POSITION: Standing.
3. LANDMARK(S): Just distal to the inferior point of the scapula.
4. INSTRUMENTS/EQUIPMENT: Harpenden skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>1.32</u>	<u>0.48</u>
RA	<u>1.31</u>	<u>0.57</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful as a measure of nutritional status.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site; the consistency of the measuring technique.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SKINFOLD: SUBSCAPULAR-HANES  
SUM OF SKINFOLDS (SUBSCAPULAR AND TRICEPS)-HES

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The thickness of the fold of skin plus subcutaneous tissue one cm. below the tip of the shoulder blade.
2. BODY POSITION: Standing.
3. LANDMARK(S): 1 cm distal to the inferior point of the scapula.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>2.73</u>	<u>1.45</u>
Women	<u>3.69</u>	<u>1.62</u>
HANES		
Men	<u>1.53</u>	<u>0.77</u>
Women	<u>1.81</u>	<u>1.04</u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: a measure of nutritional status.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the consistency of the location of the skinfold site; consistency of the measuring technique.

VARIABLE NAME: SKINFOLD: SUBSCAPULAR, LEFT

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue just below the tip of the left shoulder blade.

3. LANDMARK(S): Just distal to the inferior point of the left scapula.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67	1.89	0.49
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

		STATURE	WEIGHT	AGE
C. CORRELATION WITH:	US Army '66	_____	_____	_____
	US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: this measurement was taken only for the purpose of comparing the Lange and Harpenden skinfold calipers.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

H. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site;  
consistency of measuring technique.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: SUPRAILIAC

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying the crest of the pelvis.
2. BODY POSITION: Standing.
3. LANDMARK(S): Right mid-axillary line; crest of the right ilium.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: All reported descriptions of this dimension are the same; however, the difference in the mean values of Army and Air Force women would indicate a difference in skinfold site location and/or measuring technique (the mean weight of Air Force women is 2.2 kg. less than the mean weight of Army women).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>1.97</u>	<u>0.70</u>	4 USAF '67	<u>2.62</u>	<u>1.18</u>
2 Army Women '77	<u>1.68</u>	<u>0.71</u>	5 US Army '66	<u>2.48</u>	<u>1.07</u>
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.178</u>	<u>.705</u>	<u>.207</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>42.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE 0.4 and 3.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat deposits are distributed differently in men and women.

## G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the location of the skinfold site; the consistency of the measuring technique.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: SUPRAILLIAC, LEFT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying the crest of the left side of the pelvis.
2. BODY POSITION: Standing.
3. LANDMARK(S): Left mid-axillary line; crest of the left ilium.
4. INSTRUMENTS/EQUIPMENT: Harpenden skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	2.42	1.04
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66' and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: this measurement was taken only for the purpose of comparing the Lange and Harpenden skinfold calipers.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits than women; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the location of the skinfold site; the consistency of the measuring technique.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: TRICEPS

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a layer of skin and subcutaneous tissue on the back of the upper arm overlying the triceps muscle.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): One-half the distance between acromion and the olecranon process as measured with the elbow flexed 90 degrees.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: .

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>1.90</u>	<u>0.54</u>	4 USAF '67	<u>1.27</u>	<u>0.51</u>
2 Army Women '77	<u>1.74</u>	<u>0.50</u>	5 US Army '66		
3 USN '64	<u>1.12</u>	<u>0.44</u>	6 Army Av. '70	<u>1.17</u>	<u>0.51</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.226</u>	<u>.698</u>	<u>.149</u>

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77 <u>28.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 0.7 and 3.2  
FEMALE 0.7 and 3.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: a measure of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site; the consistency of the measuring technique.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: TRICEPS

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue on the back of the arm overlying the triceps muscle.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): One-half the distance between acromion and the lateral humeral epicondyle (elbow not flexed).
4. INSTRUMENTS/EQUIPMENT: Harpenden skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>      </u>	<u>      </u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>1.11</u>	<u>0.39</u>
RA	<u>1.01</u>	<u>0.44</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a measure of nutritional status.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site;  
the consistency of the measuring technique.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SKINFOLD: TRICEPS-HANES;  
SUM OF SKINFOLDS (TRICEPS AND SUBSCAPULAR)-HES

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of the fold of skin and subcutaneous tissue overlying the triceps muscle on the back of the upper arm.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): One-half the distance between acromion and the olecranon process as measured with elbow flexed 90 degrees.
4. INSTRUMENTS/EQUIPMENT: Lange skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>2.73</u>	<u>1.45</u>
Women	<u>3.69</u>	<u>1.62</u>
HANES		
Men	<u>1.15</u>	<u>0.59</u>
Women	<u>2.13</u>	<u>0.85</u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: a measure of nutritional status.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the consistency of the location of the skinfold site; the consistency of the measuring technique.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SKINFOLD: TRICEPS, LEFT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The thickness of a layer of skin and subcutaneous tissue on the back of the upper arm overlying the triceps muscle.
2. BODY POSITION: Standing; arms relaxed at sides.
3. LANDMARK(S): One-half the distance between acromion and the olecranon process as measured with the elbow flexed 90 degrees.
4. INSTRUMENTS/EQUIPMENT: Harpenden skinfold caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	1.23	0.43
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: measured only for a comparison between the Lange and Harpenden skinfold calipers.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among men and women of like body size, men tend on the average to have lesser fat deposits; fat deposits are distributed differently in men and women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of locating the skinfold site;  
 the consistency of the measuring technique.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SLEEVE INSEAM

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the axilla and the wrist.
2. BODY POSITION: Standing; upper extremity slightly abducted; USAF '68, USAF '77-palm forward; others-palm towards side.
3. LANDMARK(S): USN '64, USA '66, USAF '67, USA '77-anterior edge of the armpit; USAF '68, USA 77-anterior scye; wrist [USN '64, USAF '67-stylian; USA '66-"wrist" (stylian ulnae?); USA '70-"medial side of the wrist landmark" (stylian ulnae); USAF '68, USA '77-ulnar side of wrist landmark (stylian)].
4. INSTRUMENTS/EQUIPMENT: USAF '67-sleeve-inseam measuring instrument; all others-tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USN '64-measured on lateral side of the wrist; all others measured on medial side of the wrist.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>44.32</u>	<u>2.42</u>	4 USAF '67	<u>48.54</u>	<u>2.56</u>
2 Army Women '77	<u>45.05</u>	<u>2.61</u>	5 US Army '66	<u>48.59</u>	<u>2.68</u>
3 USN '64	<u>46.52</u>	<u>2.37</u>	6 Army Av. '70	<u>48.67</u>	<u>2.70</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	<u>.732</u>	<u>.346</u>	<u>-.014</u>	
	US Army '77	<u>.746</u>	<u>.357</u>	<u>-.011</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.5</u>
	US Army '77	<u>5.8</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>42.3</u>	and	<u>55.1</u>
	FEMALE	<u>39.5</u>	and	<u>51.7</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO: the definition and consistency of locating the origin and termination of the dimension.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SLEEVE INSEAM

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the axilla and the wrist.
2. BODY POSITION: Standing; right upper extremity slightly abducted.
3. LANDMARK(S): Axilla; wrist (distal wrist crease).
4. INSTRUMENTS/EQUIPMENT: Sleeve-inseam measuring instrument.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>45.41</u>	<u>2.49</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition and consistency of locating the origin and termination of the dimension.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SLEEVE INSEAM (ANTERIOR ARM LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the axilla and the wrist.
2. BODY POSITION: Standing erect; arm abducted about 30 degrees; fingers extended and palm towards side.
3. LANDMARK(S): Mid-point of the axilla; level of styliion ulnae on anterior wrist.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>42.19</u>	<u>2.87</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition and consistency of locating the origin and termination of the dimension.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SLEEVE LENGTH SEGMENT (SPINE-ELBOW LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance between the spine and the tip of the elbow with arms horizontal, the elbows flexed, fists clenched and knuckles touching.
2. BODY POSITION: Standing; arms horizontal; elbows flexed about 60 degrees; fists clenched; knuckles touching.
3. LANDMARK(S): Spine; lateral point (in reference to body position) of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>53.32</u>	<u>2.41</u>	4 USAF '67	<u>60.57</u>	<u>2.62</u>
2 Army Women '77	<u>      </u>	<u>      </u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66                       
 US Army '77                     

COEFFICIENT OF VARIATION: US Army '66         
 US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
 FEMALE        and       

D. THOUGHT TO BE OF Essential, useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; a segment of the key dimension Spine-Wrist Length.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of the plane of the tape; the consistency of the position of the arms, particularly the degree of flexion of the elbows.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SLEEVE LENGTH SEGMENT (SPINE-SCYE LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance between the spine and the armscye with the arms horizontal, elbows flexed about 60 degrees, the fists clenched and the knuckles touching.
2. BODY POSITION: Standing; arms horizontal; elbows flexed about 60 degrees; fists clenched; knuckles touching.
3. LANDMARK(S): Spine; anterior scye.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	20.37	1.36	4 USAF '67	28.45	1.81
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:      STATURE    WEIGHT    AGE  
                                  US Army '66    \_\_\_\_\_  
                                  US Army '77    \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
                                  US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE \_\_\_\_\_ and \_\_\_\_\_  
    FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; a segment of the key dimension Spine-Wrist Length.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☐    NO ☒  
                                  IN WHAT WAY?

G. REPRODUCIBILITY:    A ☐    B ☐    C ☒

IF B OR C, THE PROBLEM IS: the consistency of the plane of the tape and the consistency of the position of the arms and shoulders have a critical effect on the point at which the tape intersects the distorted anterior scye landmark.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SLEEVE LENGTH (SPINE-WRIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance between the spine and the wrist with the arms horizontal, the elbows flexed about 60 degrees; fists clenched and knuckles touching.
2. BODY POSITION: Standing; arms horizontal; shoulders relaxed; elbows flexed 60 degrees (USA '66-60 degrees ?); fists clenched and knuckles touching.
3. LANDMARK(S): Spine; USN '64, USAF '67, USA '70-styloid ulnae; USA '66-midpoint of prominence of ulnar styloid process; USAF '68-mid-posterior point on the plane of wrist circumference.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of wrist.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>79.58</u>	<u>3.32</u>	4 USAF '67	<u>90.81</u>	<u>3.52</u>
2 Army Women '77			5 US Army '66	<u>85.84</u>	<u>3.96</u>
3 USN '64	<u>88.87</u>	<u>3.50</u>	6 Army Av. '70	<u>88.63</u>	<u>3.70</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.701</u>	<u>.563</u>	<u>.058</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>4.6</u>
	US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 76.6 and 95.3  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of single- and upper-body garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the position of the arms; the consistency of the plane of the tape; the degree of flexion of the elbows; definition and consistency of locating the wrist landmark.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SLEEVE LENGTH (SPINE-WRIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal surface distance between the spine and the wrist with the arm horizontal, the elbows flexed 90 degrees; fists clenched; knuckles touching.
2. BODY POSITION: Standing; arms horizontal; shoulders relaxed; elbows flexed 90 degrees; fists touching.
3. LANDMARK(S): Spine; olecranon; wrist (stylium ulnae).
4. INSTRUMENTS/EQUIPMENT: Tape.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>85.64</u>	<u>3.68</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of single- and upper-body garments.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: position of the arms, the consistency of the plane of the tape; the degree of flexion of the elbows; definition and consistency in locating the wrist landmark.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SLEEVE OUTSEAM

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the tip of the shoulder and the wrist.
2. BODY POSITION: Standing; arm slightly abducted; palm facing forward.
3. LANDMARK(S): Acromion; stylium.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: SLEEVE LENGTH (SPINE-WRIST LENGTH)

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>53.79</u>	<u>2.96</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.782</u>	<u>.433</u>	<u>.043</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>5.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 47.1 and 60.7  
FEMALE 47.1 and 60.7

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition and location of acromion; the definition of wrist level.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: SLOPE (SHOULDER)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The angle of the slope of the shoulder.
2. BODY POSITION: Sitting erect; arms hanging at sides.
3. LANDMARK(S): Shoulder line [corresponding to the shoulder seam that originates at the lateral base of the neck (the circumference passing across cervicale and each clavicle) at the border of the trapezius, is directed towards acromion, and terminates at its intersection with the scye (shoulder point) at the shoulder].
4. INSTRUMENTS/EQUIPMENT: Protractor.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>23.08</u>	<u>4.13</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of head and shoulder position;  
consistency of placing the protractor.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SPAN

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tips of the middle fingers with the arms and the hands stretched laterally and horizontally.
2. BODY POSITION: Standing erect; upper extremities stretched laterally and horizontally to the maximum extent.
3. LANDMARK(S): Dactylia.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRG	_____	_____	RAF	<u>182.80</u>	<u>7.34</u>
RA	<u>178.25</u>	<u>7.51</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a measure of cockpit accommodation; useful as a test of the fit of single- and upper-body garments; useful for the design and layout of workspaces; a useful measure of segment additivity in analogues.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of body position.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SPHYRION HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the bottom end of the shin bone.
2. BODY POSITION: Standing.
3. LANDMARK(S): Sphyrion.
4. INSTRUMENTS/EQUIPMENT: Measuring block.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: SPHYRION (FIBULARE) HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>6.46</u>	<u>0.54</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.402</u>	<u>.239</u>	<u>-.073</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>8.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 5.2 and 7.7  
FEMALE 5.2 and 7.7

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: this dimension has been used with Tibiale Height for estimating the calf-link length for the development of anthropomorphic analogues, but Lateral and Medial Femoral Epicondyle Height and Sphyrion (Fibulare) Height more closely approximate this link.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

C. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the difficulty of precisely locating sphyrion (it is often obscured by heavy ligaments).

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: STATURE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the top of the head.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>162.10</u>	<u>6.00</u>	4 USAF '67	<u>177.34</u>	<u>6.19</u>
2 Army Women '77	<u>162.95</u>	<u>6.52</u>	5 US Army '66	<u>174.52</u>	<u>6.61</u>
3 USN '64	<u>177.64</u>	<u>5.91</u>	6 Army Av. '70	<u>174.56</u>	<u>6.33</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>          </u>	<u>.488</u>	<u>-.036</u>
US Army '77	<u>          </u>	<u>.536</u>	<u>.057</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>3.8</u>
	US Army '77	<u>4.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 158.9 and 190.3  
FEMALE 148.2 and 178.4

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a primary body clearance dimension for the design and layout of workspaces; required for the development of a body-link system; a key dimension for the development of anthropomorphic analogues; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the diurnal variation which may be ignored when subjects are measured randomly throughout the day except for those who have recently spent several hours carrying or lifting very heavy loads; in such cases a subject's stature can be reduced as much as 5 cm. owing to vertebral disk compression and increased spinal curvature.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: STATURE (KÖRPERGRÖSSE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the top of the head.
2. BODY POSITION: CF, RA<sup>1</sup>, RAF - anthropometric standing; RA<sup>2</sup> - a second measurement with the subject's feet together (instead of being parted 8 cm.); FRG - standing erect with maximum stretch, head in the Frankfurt plane.
3. LANDMARK(S): Top of the head.
4. INSTRUMENTS/EQUIPMENT: CF, FRG - anthropometer; RA, RAA - measuring rig; RAF - measuring rig<sup>3</sup> and anthropometer<sup>4</sup> (check U.S. vs. U.K. technique).
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD	$\bar{X}$	SD
CF	175.05	6.32			RAA	174.04	5.93		
FRG	174.5	6.2			RAF	177.44	6.23	4177.00	6.20
RA	173.38	6.29	2173.02	6.25					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a required clearance dimension for the design and layout of workspaces; required for the development of a body-link system; a key dimension for the development of anthropomorphic analogues; useful for the design and sizing of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: diurnal variation which may be ignored when subjects are measured randomly throughout the day except for those who have recently spent several hours carrying or lifting very heavy loads; in such cases a subject's stature can be reduced as much as 5 cm. owing to vertebral compression and increased spinal curvature.

DIMENSION EVALUATION SHEET  
FOR LARGE SCALE ( $N > 500$ )  
ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: STATURE

A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the top of the head.
2. BODY POSITION: Bureau of Home Economics - anthropometric standing with buttocks or shoulders just touching the wall; HES and HANES - anthropometric standing with back against a vertical scale.
3. LANDMARK(S): The top of the head.
4. INSTRUMENT(S)/ EQUIPMENT: Bureau of Home Economics - anthropometer; HES and HANES - 3" wide vertical scale; photographic setup; anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Bureau of Home Econ. - subjects stood with the slightest of support; HES and HANES - subjects stood with back against a vertical scale, were photographed and stature read from the pictures (subjects greater than 190.5 cm were measured with an anthropometer while standing free); subjects measured against a vertical support are almost always taller than when standing free (on men, by an average of about 1.0 cm.).

ALTERNATIVE DIMENSIONS:

B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>160.43</u>	<u>6.30</u>
HES		
Men	<u>174.46</u>	<u>6.64</u>
Women	<u>161.51</u>	<u>6.21</u>
HANES		
Men	<u>176.20</u>	<u>7.00</u>
Women	<u>162.68</u>	<u>6.35</u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations of people for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a required clearance dimension for the design and layout of workspaces; a key dimension for the development of anthropomorphic analogues; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F PARTICULARLY SENSITIVE TO: diurnal variation which may be ignored when subjects are measured randomly throughout the day except for those who have recently spent several hours carrying or lifting very heavy loads; in such cases a subject's stature can be reduced as much as 5 cm. owing to vertebral compression and increased spinal curvature.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: STATURE, ESTIMATED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The self-estimate of a subject's stature made shortly before its measurement.
2. BODY POSITION:
3. LANDMARK(S):
4. INSTRUMENTS/EQUIPMENT:
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION SOLICITED IN THE FOLLOWING U.S. MILITARY SURVEYS: CORRELATIONS WITH MEASURED STATURE

SURVEY	$\bar{X}$	SD	r	SURVEY	$\bar{X}$	SD	r
1 AF Women '68	164.38	6.16	.953	4 USAF '67	176.74	6.01	.956
2 Army Women '77	163.97	6.87	.964	5 US Army '66	177.31	6.89	.941
3 USN '64				6 Army Av. '70	177.98	6.50	.943
				7 AF Questionnaire Sur. '67			.940 (QE) *.954 (PME)

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE	EST. WT.
	US Army '77	.941	.500	-.017	.508
		.964	.535	.051	.543

COEFFICIENT OF VARIATION:	US Army '66	3.9
	US Army '77	4.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 160.6 and 193.0  
FEMALE 148.5 and 180.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required to establish the validity of questionnaire surveys of Stature and Weight for detecting significant changes in body-size distributions.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: individuals who know that their estimate will be checked will presumably respond with more care.

\*Estimate (QE) from questionnaire survey administered during Oct. '66; pre-measurement estimate (PME) and measurement made during the survey period (Jan-March '67).

(N=196)

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: STOMACH BREADTH

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The maximum breadth of the torso below the nipples and above the hip.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Lateral points of the torso below the ilion and above trochanterion. (This dimension may be equivalent to Bicristal Breadth).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: BICRISTAL BREADTH

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>31.71</u>	<u>2.86</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: Bicristal Breadth is the preferred dimension. Stomach Breadth is also considered superfluous if Waist Breadth and Hip Breadth are in a data base.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: STOMION-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the closed lips and the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Stomion; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>17.83</u>	<u>1.12</u>	4 USAF '67	<u>18.37</u>	<u>1.00</u>
2 Army Women '77	<u>16.84</u>	<u>1.01</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.253</u>	<u>.219</u>	<u>.102</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>6.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 14.7 and 19.1

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger heads than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; how tightly the subject presses the lips together.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: STOMION-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the juncture of the lips and the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Stomion; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: LIP PROTRUSION-WALL

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>20.10</u>	<u>1.16</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.167</u>	<u>.305</u>	<u>.070</u>

COEFFICIENT OF VARIATION: US Army '66  
US Army '77 5.8

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 18.0 and 23.7  
FEMALE 18.0 and 23.7

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design, sizing, procurement and issuing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among White, Black, and Asian males of like body size, Whites and Asians tend on the average to have less prognathism and lip eversion than Blacks.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation, how tightly the subject presses the lips together.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: STRAP LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the right bustpoint across the back of the neck to the left bustpoint.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Bustpoints; posterior neck point (neck plane established with a T-xas tie around the neck/shoulder juncture in a plane perpendicular to the long axis of the neck).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: NECK-BUST (Bureau of Home Economics)

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	65.22	3.92	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of the neck landmark; the point of respiration at which the measurement is taken; the type and fit of bra worn.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SUBNASALE-SELLION LENGTH (NOSE LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the bottom of the nose and the nasal root depression.
2. BODY POSITION: Sitting.
3. LANDMARK(S): Subnasale; sellion.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>4.55</u>	<u>0.41</u>	4 USAF '67	<u>5.13</u>	<u>0.37</u>
2 Army Women '77	<u>4.58</u>	<u>0.33</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>5.34</u>	<u>0.37</u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.370</u>	<u>.121</u>	<u>.095</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>      </u>
	US Army '77	<u>7.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 3.8 and 5.3

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have longer noses than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: compression of the tissue at subnasale.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SUBNASALE-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the base of the nose to the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Subnasale; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>15.91</u>	<u>1.10</u>	4 "AF '67	<u>16.09</u>	<u>1.02</u>
2 Army Women '77	<u>14.80</u>	<u>0.95</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.245</u>	<u>.178</u>	<u>.088</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>6.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 12.6 and 16.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger heads than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SUBNASALE-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance from the base of the nose to the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Subnasale; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	19.66	0.98	4 USAF '67	20.99	0.79
2 Army Women '77	20.11	1.00	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.243	.332	.048

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	5.0

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE 18.0 and 22.9

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the face.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have greater head length than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SUBSTERNAL HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the bottom of the breast bone.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Inferior point of the xyphoid process.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## D. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>113.92</u>	<u>4.97</u>	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			<u>.932</u>	<u>.551</u>	<u>.184</u>

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	<u>4.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 103.4 and 127.0  
FEMALE 103.4 and 127.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful for the development of ballistic wound analogues and personal body armor.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the inferior point of the xyphoid process is difficult to locate precisely on some subjects because of the variability of its configuration.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: SUPRASTERNAL HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the bottom of the notch in the top of the breast bone.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Suprasternale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>132.00</u>	<u>5.30</u>	4 USAF '67	<u>145.20</u>	<u>5.50</u>
2 Army Women '77	<u>132.62</u>	<u>5.65</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>145.29</u>	<u>5.33</u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.985</u>	<u>.567</u>	<u>.212</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>4.3</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 120.7 and 147.2

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of a body-link system.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: SUPRASTERNALE HEIGHT (STERNALHÖHE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the bottom of the notch in the top of the breast bone.
2. BODY POSITION: Standing with maximum stretch.
3. LANDMARK(S): Suprasternale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	$\bar{X}$	SD	<u>SURVEY</u>	$\bar{X}$	SD
CF			RAA		
FRG	<u>143.3</u>	<u>5.8</u>	RAF		
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of a body-link system.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THIGH CIRCUMFERENCE (UPPER THIGH CIRCUMFERENCE)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the thigh perpendicular to its long axis at the level of the junction of the thigh and buttock.
2. BODY POSITION: Standing; feet parted enough to separate the thighs.
3. LANDMARK(S): Distal gluteal furrow.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>55.48</u>	<u>4.22</u>	4 USAF '67	<u>58.81</u>	<u>4.43</u>
2 Army Women '77	<u>56.90</u>	<u>4.55</u>	5 US Army '66	<u>55.42</u>	<u>4.80</u>
3 USN '64	<u>57.48</u>	<u>4.02</u>	6 Army Av. '70	<u>58.47</u>	<u>5.24</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.219</u>	<u>.857</u>	<u>.128</u>
	US Army '77	<u>.287</u>	<u>.883</u>	<u>.119</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>8.7</u>
	US Army '77	<u>8.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>45.5</u>	and	<u>67.6</u>
	FEMALE	<u>46.4</u>	and	<u>68.9</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller thighs than women.

C. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO. compression of the tissue; lane of the tape; some subjects do not have a well-defined gluteal furrow.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: THIGH CIRCUMFERENCE (UPPER THIGH CIRCUMFERENCE)  
(OBERSCHENKELUMFANG)

## A. DESCRIPTION OF DIMENSION AND MEASURING TECHNIQUES:

1. DESCRIPTION: The circumference of upper thigh.
2. BODY POSITION: FRG-standing with one leg on platform so that the knee is flexed 90 degrees; RA, RAF-standing; feet spread approximately 15 cm; weight distributed evenly on both feet.
3. LANDMARK(S): FRG-level of the maximum circumference of horizontal thigh; RA, RAF-level of the inferior point of the gluteal furrow.
4. INSTRUMENTS/EQUIPMENT: FRG-tape and foot support; RA, RAF-tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Differences in landmarks and body position.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>57.1</u>	<u>3.1</u>	RAF	<u>56.98</u>	<u>3.87</u>
RA	<u>57.43</u>	<u>4.62</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: compression of the tissue; plane of the tape; some subjects do not have a well-defined gluteal furrow.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THIGH CIRCUMFERENCE, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the upper thigh of a seated subject.
2. BODY POSITION: Sitting erect; thighs lightly touching; feet unsupported.
3. LANDMARK(S): Thigh level as close to the crotch as possible.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	57.87	4.27
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH:      STATURE    WEIGHT    AGE  
                                  US Army '66    \_\_\_\_\_  
                                  US Army '77    \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
                                  US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE \_\_\_\_\_ and \_\_\_\_\_  
    FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: This dimension has not, to our knowledge, been used for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE?    YES ☐    NO ☒    GENDER SENSITIVE?    YES ☒    NO ☐  
                                  IN WHAT WAY?    Among men and women of like body size, men tend on the average to have smaller thighs than women.

G. REPRODUCIBILITY:    A ☐    B ☒    C ☐

IF B OR C, THE PROBLEM IS: the consistency of establishing the plane at which the measurement is taken.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THIGH CLEARANCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the thigh.
2. BODY POSITION: Sitting erect; knees flexed 90 degrees; feet supported.
3. LANDMARK(S): USAF '67, USAF '68, USA '70-highest point on the thigh; USA '77-torso/thigh juncture.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Data indicate differences of measuring technique that are not explicable by the reported dimension descriptions.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	12.44	1.25	4 USAF '67	16.53	1.38
2 Army Women '77	15.41	1.31	5 US Army '66		
3 USN '64			6 Army Av. '70	14.70	1.40

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.204	.764	.092

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	8.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 12.5 and 18.9  
FEMALE 12.5 and 18.9

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a basic clearance dimension required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design, sizing, procurement and issuing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller thighs than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the consistency of locating the highest point on the thigh, and the height of the foot support.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: THIGH CLEARANCE (DICKE DES OBERSCHENKELS)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the highest point on the thigh.
2. BODY POSITION: Sitting; FRG-thighs completely supported by the sitting surface; calves hanging free; RA, RAA, RAF-knees flexed 90 degrees; feet supported.
3. LANDMARK(S): Highest point on the thigh.
4. INSTRUMENTS/EQUIPMENT: FRG-anthropometer; RA, RAA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: FRG-no foot support.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA	*17.14	1.25
FRG	<u>15.1</u>	<u>*0.7</u>	RAF	<u>15.84</u>	<u>1.22</u>
RA	<u>15.65</u>	<u>1.50</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a basic clearance dimension required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design, sizing, procurement and issuing of single- and lower-body garments.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: consistency of locating the highest point of the thigh, and the height of the foot support.

## F. PARTICULARLY SENSITIVE TO:

\*Reason for least and greatest values not known--both suspect.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: THIGH CLEARANCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the thigh at the junction of the thigh and the torso.
2. BODY POSITION: Sitting erect; knees flexed 90 degrees; feet supported.
3. LANDMARK(S): Abdomen/thigh juncture.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	_____	_____
HES		
Men	<u>14.56</u>	<u>1.69</u>
Women	<u>13.79</u>	<u>1.84</u>
HANES		
Men	_____	_____
Women	_____	_____

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a basic clearance dimension required for the design and layout of seated workspaces; required for the development of anthropomorphic analogues; useful for the design, sizing, procurement and issuing of single- and lower-body garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: consistency of location of the thigh/torso juncture on particularly heavy individuals.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THIGH-THIGH BREADTH, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The maximum horizontal distance across the thighs of a seated subject.
2. BODY POSITION: Sitting erect; thighs parallel; knees flexed 90 degrees.
3. LANDMARK(S): Lateral points of the thighs.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>38.19</u>	<u>2.86</u>	4 USAF '67	<u>      </u>	<u>      </u>
2 Army Women '77	<u>38.27</u>	<u>3.27</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.374</u>	<u>.840</u>	<u>.206</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>      </u>
	US Army '77	<u>8.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 31.6 and 47.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces; required as a seated clearance dimension; required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have smaller thighs than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



VARIABLE NAME: THIGH-THIGH BREADTH, SITTING, OVER FOUNDATION GARMENT

1. DESCRIPTION: The maximum horizontal distance across the thighs of a seated subject wearing a foundation garment.
2. BODY POSITION: Sitting erect; thighs parallel; knees flexed 90 degrees.
3. LANDMARK(S): Lateral points of the thighs.
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>37.25</u>	<u>2.65</u>	4	USAF '67	<u>          </u>	<u>          </u>
2	Army Women '77	<u>          </u>	<u>          </u>	5	US Army '66	<u>          </u>	<u>          </u>
3	USN '64	<u>          </u>	<u>          </u>	6	Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:		STATUS	WEIGHT	AGE
US Army	'66			
US Army	'77			

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THUMB CROTCH LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the crotch of the thumb and the crotch between the first and second fingers.
2. BODY POSITION: Hand and fingers extended; palm up; thumb abducted.
3. LANDMARK(S): Crotch of thumb; crotch between digits II and III.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	<u>4.97</u>	<u>0.52</u>
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.295</u>	<u>.244</u>	<u>.010</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>10.45</u>
	US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 3.81 and 6.23  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful as one in a series of dimensions for the design and sizing of gloves.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend to have shorter hands than blacks; among men and women of like body size, men tend to have larger hands than women.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: the consistency of the degree of thumb abduction; consistency of locating point on skinfold.

## H. PARTICULARLY SENSITIVE TO

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: THUMB LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The straight line distance between the tip and the base of the thumb.
2. BODY POSITION: Hand fully extended; fingers together; thumb abducted.
3. LANDMARK(S): Tip of the thumb; phalangeion I.
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	<u>6.69</u>	<u>0.42</u>
FRG	_____	_____	RAF	_____	_____
RA	_____	_____			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design of hand controls requiring thumb use, e.g., aircraft control stick; useful as one in a series of dimensions required for the development of sizing systems/programs for gloves.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: degree of thumb abduction.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL.

VARIABLE NAME: THUMB TIP REACH (FUNCTIONAL REACH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the plane of the back and the tip of the thumb with a subject's arm and hand extended forward horizontally.
2. BODY POSITION: Standing erect; back against a wall; arm extended horizontally; index finger touching thumb.
3. LANDMARK(S): Tip of the thumb; plane of the back.
4. INSTRUMENTS/EQUIPMENT: USA '66, USAF '67-anthropometer; all others-mounted wall scale.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USA '77-most subjects wore fatigues and boots (10 percent wore slacks and shoes); all others-boxer shorts/briefs, bra and panties.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 At Women '68	<u>74.13</u>	<u>3.88</u>	4 USAF '67	<u>80.31</u>	<u>3.98</u>
2 Army Women '77	<u>71.17</u>	<u>4.53</u>	5 US Army '66	<u>82.60</u>	<u>4.85</u>
3 USN '64	<u>80.03</u>	<u>3.61</u>	6 Army Av. '70	<u>79.34</u>	<u>4.12</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.577</u>	<u>.372</u>	<u>.010</u>
	US Army '77	<u>.571</u>	<u>.422</u>	<u>-.214</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.9</u>
	US Army '77	<u>6.4</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 71.9 and 94.6  
FEMALE 60.3 and 81.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces where shoulders may be restrained; required for the development of anthropomorphic analogues; may be a criterion for aircraft accommodation.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the variability of forward movement of the shoulder girdle; degree of pressure subject exerts against the back support. Data demonstrate well the vagaries of this measurement.

## H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: THUMB TIP REACH (FUNCTIONAL REACH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the plane of the back and the tip of the thumb with the subject's arm and hand extended forward horizontally.
2. BODY POSITION: CF-standing erect; shoulders and buttocks against wall; arm extended horizontally; index finger touches pad of thumb; RA, RAA, RAF-sitting erect (arm and hand position the same as for the CF).
3. LANDMARK(S): Tip of the thumb; plane of the back.
4. INSTRUMENTS/EQUIPMENT: CF-wall scale; RA, RAA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF-not designated; RA, RAF-back and buttocks firmly pressed against back support; RAA-shoulders "lightly" touching back support.

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>79.40</u>	<u>4.24</u>	RAA	<u>78.16</u>	<u>3.51</u>
FRG			RAF	<u>80.17</u>	<u>3.58</u>
RA	<u>77.73</u>	<u>3.91</u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces where shoulders may be restrained; required for the development of anthropomorphic analogues; may be a criterion for aircraft accommodation.

E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: the variability of the forward movement of the shoulder girdle; degree of pressure subject exerts against the back support. Data demonstrate well the vagaries of this measurement.

F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: THUMB TIP REACH, EXTENDED (FUNCTIONAL REACH, EXTENDED)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the plane of the back of a subject standing erect with back against a wall and the tip of the right thumb, while the right shoulder, arm, hand and thumb are extended forward in a horizontal plane and the left shoulder is in firm contact with the wall.
2. BODY POSITION: Standing erect in a corner; right shoulder moved forward as far as possible while maintaining firm pressure of the left shoulder against the wall; arm, hand, and thumb are extended forward horizontally; index finger touches pad of thumb.
3. LANDMARK(S): Tip of the thumb.
4. INSTRUMENTS/EQUIPMENT: USAF '67-anthropometer; USAF '68 and USA '77-wall scale and block.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USA '77-Most subjects wore fatigues and boots (10 percent wore slacks and shoes).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>83.83</u>	<u>4.88</u>	4 USAF '67	<u>99.59</u>	<u>4.51</u>
2 Army Women '77	<u>83.15</u>	<u>5.86</u>	5 US Army '66	<u>      </u>	<u>      </u>
3 USN '64	<u>      </u>	<u>      </u>	6 Army Av. '70	<u>      </u>	<u>      </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.578</u>	<u>.392</u>	<u>-.271</u>

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE        and         
FEMALE 68.6 and 95.5

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the design and layout of workspaces; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: achieving a consistent body position; degree of forward shoulder movement and left shoulder pressure against the wall are difficult to control.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TIBIALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and a point just below the inside of the knee.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Tibiale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: KNEE HEIGHT (SUPRAPATELLA); KNEE HEIGHT (INFRAPATELLA); LATERAL AND MEDIAL FEMORAL EPICONDYLE HEIGHTS

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>41.91</u>	<u>2.38</u>	4 USAF '67	<u>          </u>	<u>          </u>
2 Army Women '77	<u>44.05</u>	<u>2.47</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.843</u>	<u>.440</u>	<u>.121</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>5.6</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>38.6</u>	and	<u>50.6</u>
	FEMALE	<u>          </u>	and	<u>          </u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: marginal as an approximation of Knee Height; marginal for the development of a body-link system.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter calves than Blacks and longer calves than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the identification of tibiale (particularly difficult on subjects with well-developed leg muscles).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: TIBIALE HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and a point just below the inside of the knee.

2. BODY POSITION: Anthropometric standing.

3. LANDMARK(S): Tibiale.

4. INSTRUMENTS/EQUIPMENT: Anthropometer.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: KNEE HEIGHT (SUPRAPATELLA); KNEE HEIGHT, (INFRAPATELLA); LATERAL AND MEDIAL FEMORAL EPICONDYLE HEIGHTS

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>43.74</u>	<u>2.72</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: marginal as an approximation of Knee Height; marginal for the development of a body-link system.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the location of tibiale (particularly difficult to locate on subjects with well-developed leg muscles).



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: TOTAL POSTERIOR ARM LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the end of the shoulder and the wrist with the measuring tape passing over the tip of the bent elbow.
2. BODY POSITION: Standing; fist clenched and placed on hip; wrist is not bent.
3. LANDMARK(S): Shoulder point (on the top of the shoulder midway between acromion and the superior point of the lateral end of the clavicle); stylium ulnae.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: SLEEVE LENGTH (SPINE-WRIST)

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>58.42</u>	<u>2.97</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: marginal for the design, sizing, procurement and issuing of single- and upper-body garments; Sleeve Length (Spine-Wrist) is the preferred dimension.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: consistency of arm position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TRACION HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tragus of the ear.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Tracion.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: TRACION-TOP OF HEAD; HEAD HEIGHT

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	<u>164.85</u>	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66	_____	_____	_____
US Army '77	_____	_____	_____

COEFFICIENT OF VARIATION: 

US Army '66	_____
US Army '77	_____

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE	_____	and	_____
FEMALE	_____	and	_____

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: maintaining the head in the Frankfort plane.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TRAGION-TOP OF HEAD (HEAD HEIGHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the tragus of the ear and the plane of the top of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Tragion; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: USN '64, USA '66-anthropometer; all others-headboard; headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>12.73</u>	<u>0.76</u>	4 USAF '67	<u>13.45</u>	<u>0.61</u>
2 Army Women '77	<u>13.19</u>	<u>0.67</u>	5 US Army '66	<u>13.23</u>	<u>0.79</u>
3 USN '64	<u>13.11</u>	<u>0.64</u>	6 Army Av. '70	<u>13.29</u>	<u>0.57</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.197</u>	<u>.225</u>	<u>-.072</u>
US Army '77	<u>.294</u>	<u>.320</u>	<u>.024</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>6.0</u>
	US Army '77	<u>5.1</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 11.3 and 15.0  
FEMALE 11.8 and 14.8

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation; when measured with an anthropometer, keeping the instrument vertical.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: TRAGION-TOP OF HEAD

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the tragus and the plane of the top of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Tragion; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG			RAF	<u>13.03</u>	<u>0.64</u>
RA	<u>12.68</u>	<u>0.63</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TRAGION-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The distance between the tragion and the plane of the back of the head.
2. BODY POSITION: Standing; head in the Frankfort plane.
3. LANDMARK(S): Tragion; plane of the back of the head.
4. INSTRUMENTS/EQUIPMENT: USN '64, USA '66-anthropometer; all others-headboard, headboard gauge.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>10.17</u>	<u>0.90</u>	4 USAF '67	<u>10.33</u>	<u>0.65</u>
2 Army Women '77	<u>10.06</u>	<u>0.91</u>	5 US Army '66	<u>10.28</u>	<u>1.19</u>
3 USN '64	<u>10.81</u>	<u>0.76</u>	6 Army Av. '70	<u>10.32</u>	<u>0.69</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.076</u>	<u>.132</u>	<u>.015</u>
	US Army '77	<u>.130</u>	<u>.215</u>	<u>.057</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>11.6</u>
	US Army '77	<u>9.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>7.9</u>	and	<u>12.9</u>
	FEMALE	<u>8.6</u>	and	<u>12.9</u>

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: TRAGION-WALL

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the tragus and the plane of the back of the head.
2. BODY POSITION: Sitting; head in the Frankfort plane.
3. LANDMARK(S): Tragion; plane of the top of the head.
4. INSTRUMENTS/EQUIPMENT: Head measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG			RAF	<u>10.14</u>	<u>0.69</u>
RA	<u>10.02</u>	<u>0.68</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of three-dimensional head and face forms used to guide the design and sizing of equipment worn on the head and on the face; useful for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: maintaining the head in its required vertical and horizontal (Frankfort plane) orientation.

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TROCHANTERIC HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of the bony protrusion at the side of the top of the thigh bone.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Trochanteric.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	82.67	4.27	4 JSAF '67	93.96	4.35
2 Army Women '77	85.91	4.43	5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66			
US Army '77	.846	.504	.136

COEFFICIENT OF VARIATION:	US Army '66	
	US Army '77	5.2

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES  
 LE MALES 11.1 and 96.6

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of a body-link system.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter lower extremities than Blacks and longer lower extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

OF C, THE PROBLEM IS:

NOTICABLY SENSITIVE TO: location of the landmark (especially difficult to locate on muscular and heavy subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: TRUNK HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the top of the breast bone.
2. BODY POSITION: Anthropometric sitting.
3. LANDMARK(S): Suprasternale.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	_____	_____
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	<u>58.39</u>	<u>2.65</u>

C. CORRELATION WITH:      STATURE    WEIGHT    AGE  
                                  US Army '66    \_\_\_\_\_  
                                  US Army '77    \_\_\_\_\_

COEFFICIENT OF VARIATION:    US Army '66    \_\_\_\_\_  
    US Army '77    \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:    MALE    \_\_\_\_\_ and \_\_\_\_\_  
    FEMALE    \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS:    useful for the development of body armor; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE?    YES ☒    NO ☐    GENDER SENSITIVE?    YES ☐    NO ☒  
     IN WHAT WAY?    Among Whites and Blacks of like body size, Whites tend on the average to have longer torsos than Blacks.

G. REPRODUCIBILITY:    A ☒    B ☐    C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: UPPER POSTERIOR ARM LENGTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The surface distance along the outside of the arm between the end of the shoulder and the elbow with the fist clenched and placed on the hip.
2. BODY POSITION: Standing; right fist clenched and placed on the hip; wrist straight.
3. LANDMARK(S): Shoulder point (on the top of the shoulder midway between acromion and the superior point of the lateral end of the clavicle); the tip of the olecranon process.
4. INSTRUMENTS/EQUIPMENT: Tape.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: SLEEVE LENGTH SEGMENT (SPINE-ELBOW LENGTH)

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>33.73</u>	<u>1.93</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: of marginal value for the design and sizing, of single- and upper-body garments. Sleeve Length Segment (Spine-Elbow Length) is the preferred dimension because it is a part of the more traditional technique of measuring sleeve length used by the U.S. military services.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the consistency of arm position.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: VERTICAL GRIP REACH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the tip of a pointer grasped horizontally by a subject stretching the arm over the head.
2. BODY POSITION: Standing erect; upper extremity extended vertically as far as possible; both feet on the floor.
3. LANDMARK(S): Tip of the pointer.
4. INSTRUMENTS/EQUIPMENT: Wall mounted scale; pointer.

## 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: VERTICAL REACH, SITTING

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	199.23	8.56	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for limiting the height of equipment or controls located overhead; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of body position (particularly the shoulder).

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: VERTICAL REACH, SITTING (OVERHEAD REACH, SITTING)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance from the sitting surface to the tip of the middle finger of a fully extended arm, hand and fingers.
2. BODY POSITION: Sitting erect; upper extremity fully extended overhead.
3. LANDMARK(S): Dactylion.
4. INSTRUMENTS/EQUIPMENT: USA '66-anthropometer; USA '70, USA '77-wall mounted scale.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USA '66 USA '70-upper body nude; USA '77-most subjects wore fatigues and boots (10 percent wore slacks and shoes).

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77	<u>129.02</u>	<u>6.61</u>	5 US Army '66	<u>138.23</u>	<u>5.80</u>
3 USN '64			6 Army Av. '70	<u>143.47</u>	<u>5.81</u>

C. CORRELATION WITH:	STATURE	WEIGHT	AGE
US Army '66	<u>.834</u>	<u>.460</u>	<u>-.038</u>
US Army '77	<u>.750</u>	<u>.514</u>	<u>-.157</u>

COEFFICIENT OF VARIATION:	US Army '66	US Army '77
	<u>4.2</u>	<u>5.1</u>

1st and 99th US ARMY '66 PERCENTILE VALUES: MALE 124.7 and 152.6  
 \*5th and 95th US ARMY '77 PERCENTILE VALUES: FEMALE 117.4 and 139.4

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: required for the design and layout of seated workspaces with overhead controls; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

## G. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of body position (particularly the shoulder); difference between USA '66 and USA '70 mean values inexplicable (USA '66 had 3.3 cm. greater mean Thumb-Tip Reach than USA '70 with both having practically identical mean Statures).

## H. PARTICULARLY SENSITIVE TO:

\*n = 300.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: VERTICAL THUMB TIP REACH, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the tip of the thumb touching an index finger of an arm stretched above the head.
2. BODY POSITION: Sitting erect; upper extremity stretched vertically; index finger touching pad of thumb.
3. LANDMARK(S): Tip of the thumb.
4. INSTRUMENTS/EQUIPMENT: Measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEY:

<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{x}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____
FRC	_____	_____	RAF	<u>138.35</u>	<u>5.53</u>
RA	<u>136.85</u>	<u>5.15</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: required for the design and layout of seated workspaces with overhead controls; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☐ B ☐ C ☒

IF B OR C, THE PROBLEM IS: consistency of body position (particularly the shoulders).

## F. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: VERTICAL TRUNK CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the torso passing over the shoulder, nipple (or bustpoint), through the crotch, and over the posterior point of a buttock.
2. BODY POSITION: Anthropometric standing. (USAF '67-left hand holds tape on anterior torso).
3. LANDMARK(S): Midshoulder; thelion (or bustpoint); posterior buttock point.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USAF '68, USA '70, USA '77-tape does not lie on the anterior contour of the torso; USAF '67-tape lies on anterior contour of the torso.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	154.43	6.87	4 USAF '67	168.07	7.16
2 Army Women '77	153.82	7.21	5 US Army '66	164.11	8.49
3 USN '64	167.32	6.66	6 Army Av. '70	169.39	7.58

C. CORRELATION WITH:	US Army '66	US Army '77	STATURE	WEIGHT	AGE
			.544	.754	.149
			.658	.807	.209

COEFFICIENT OF VARIATION:	US Army '66	5.2
	US Army '77	4.7

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES.	MALE 145.4	and 185.9
	FEMALE 136.5	and 171.6

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a potential key dimension for the design, sizing, procurement and issuing of single-body garments; required for the construction of clothing manikins; useful for the development of load-carrying systems with crotch straps.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
 IN WHAT WAY? Among Whites and Blacks like body size, Whites tend on the average to have longer torsos than Blacks. Breast configuration affects this measurement.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of placing the tape in the same plane; position of the shoulders; the point of respiration at which the measurement is taken; tension of the abdominal muscle; degree of tension on the tape.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: VERTICAL TRUNK CIRCUMFERENCE (VERTIKALAR UMFANG)  
(VERTICAL TRUNK CIRCUMFERENCE - MEAN)\*

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the trunk passing over the shoulder, nipple, and over a buttock (CF) or between the buttocks (FRG, RAA, RAF) and through the crotch; (\*RAA, RAF - means of measurements over right and left shoulders).
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): CF, FRG-posterior buttock point, thelion, midshoulder; RAA, RAF-thelion, midshoulder.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: CF, RAA, RAF-tape spans all body hollows; FRG-tape lies on body surface; CF-tape passes over a buttock; FRG, RAA, RAF-tape passes between the buttocks; pressure applied to tape (RAA-"firm pressure" applied to crotch).

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>167.96</u>	<u>8.82</u>	RAA	<u>161.03</u>	<u>7.28</u>
FRG	<u>162.7</u>	<u>7.5</u>	RAF	<u>162.52</u>	<u>6.55</u>
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: a potential key dimension (used as a key dimension in the United Kingdom) for the design, sizing, procurement and issuing of single-body garments; required for the construction of clothing manikins; useful for the development of load-carrying systems with crotch traps.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: the consistency of placing the tape in the same plane; position of shoulders; the point of respiration at which the measurement is taken; tension of the abdominal muscles; tension applied to the tape.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: VERTICAL TRUNK CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the trunk passing over the shoulder, bust point and through the crotch between the buttocks.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Mid-shoulder point (one-half the distance between shoulder point (midway between acromion and the superior point of the clavicle) and the lateral base of the neck (medial termination of the shoulder line - see Shoulder Length, U.S. Civilians).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUKEAU OF HOME ECONOMICS	<u>152.60</u>	<u>8.43</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a potential key dimension for the design, sizing, procurement and issuing of single-body garments; required for the construction of clothing manikins; useful for the development of load-carrying systems with crotch straps.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the consistency of placing the tape in the same plane; position of the shoulders; the point of respiration at which the measurement is taken; tension of the abdominal muscle; degree of tension on the tape.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: VERTICAL TRUNK CIRCUMFERENCE, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical circumference of the torso of a seated subject passing over the shoulder, nipple (or bust point); through the crotch, and over the maximum protrusion of a buttock.
2. BODY POSITION: Sitting erect looking straight ahead; shoulders relaxed (USAF '67-subject's left hand holds tape on waist).
3. LANDMARK(S): Midshoulder; the lion (or bust point); posterior buttock point.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USAF '68, USA '70, USA '77-tape does not lie on the anterior contour of the torso; USAF '67-tape lies on the anterior contour of the torso.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>150.07</u>	<u>6.56</u>	4 USAF '67	<u>161.31</u>	<u>6.95</u>
2 Army Women '77	<u>146.44</u>	<u>7.26</u>	5 US Army '66	<u>162.76</u>	<u>7.21</u>
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.685</u>	<u>.732</u>	<u>.251</u>

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77 <u>5.0</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE and  
FEMALE 131.7 and 164.0

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single-body garments worn primarily in the seated position.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend on the average to have longer torsos than Blacks. Breast tissue affects this dimension.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the consistency of placing the tape in the same plane; position of the shoulders; the point of respiration at which the measurement is taken; tension of the abdominal muscles; the tension on the tape.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST BACK LENGTH (POSTERIOR WAIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the back of the base of the neck and the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale; waist level (USAF '68, USA '77-preferred; USA '66, USAF '67, USA '70-omphalion).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>40.51</u>	<u>2.22</u>	4 USAF '67	<u>46.92</u>	<u>2.37</u>
2 Army Women '77	<u>40.85</u>	<u>2.65</u>	5 US Army '66	<u>45.03</u>	<u>3.44</u>
3 USN '64			6 Army Av. '70	<u>46.68</u>	<u>2.54</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.427</u>	<u>.321</u>	<u>.084</u>
	US Army '77	<u>.520</u>	<u>.313</u>	<u>.053</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>7.6</u>
	US Army '77	<u>6.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 37.5 and 53.0  
FEMALE 35.3 and 47.5

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend on the average to have longer torsos than blacks.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

OR THE PROBLEM IS:

H. PARTIALY SENSITIVE TO: the definition of waist level; identification of waist level is difficult to locate precisely on many subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WAIST BACK LENGTH (POSTERIOR WAIST LENGTH)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance from the base of the neck to the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Cervicale; waist level (average height of the inferior points of the 12th ribs.)
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>38.02</u>	<u>2.36</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level; identification of cervicale (it is difficult to locate precisely on many subjects); identification of the inferior points of the 12th ribs (they are difficult to locate precisely on heavier subjects).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST BREADTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal breadth of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (USN '64-natural indentation; USAF '68, USA '77-preferred; USAF '67-omphalion).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

	SURVEY	$\bar{X}$	SD		SURVEY	$\bar{X}$	SD
1	AF Women '68	<u>24.13</u>	<u>1.94</u>	4	USAF '67	<u>30.96</u>	<u>2.39</u>
2	Army Women '77	<u>25.57</u>	<u>2.42</u>	5	US Army '66	<u>          </u>	<u>          </u>
3	USN '64	<u>30.40</u>	<u>2.12</u>	6	Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.245</u>	<u>.737</u>	<u>.243</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>9.5</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 21.2 and 33.0  
FEMALE 21.2 and 33.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend on the average to have larger waists than Blacks. Among men and women of like body size, men tend on the average to have larger waists than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST BREADTH OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal breadth of the waist of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	21.39	1.92	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: 

US Army '66	
US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE		and	
FEMALE		and	

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level [USN '64-natural indentation; USAF '68, USA '77 (core)-preferred (2)\*; USA '66, USAF '67, USA '70, USA '77 (traditional subseries) omphalion (2a)\*\*].†
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	67.20	5.48	4 USAF '67	87.60	7.38
*2 Army Women '77	70.98	6.78	5 US Army '66	80.29	8.18
**2a Army women '77	76.29	7.89	6 Army Av. '70	87.13	8.61
3 USN '64	85.37	6.58			

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		.228	.855	.313
*US Army '77		.208	.787	.223

COEFFICIENT OF VARIATION:	US Army '66	10.2
	*US Army '77	9.6

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 66.3 and 105.6  
\*FEMALE 59.0 and 92.1

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension required for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; required for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among Whites and Blacks of like body size, Whites tend on the average to have larger waists than Blacks. Among men and women of like body size, men tend on the average to have larger waists than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

† Waist level at the natural indentation is a marginal dimension. Waist level established by the subject (preferred) is essential only for Army women since it is required for procurement purposes. Waist level at omphalion is the dimension of choice.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WAIST CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level(CF- waist level, preferred<sup>1</sup>, omphalion<sup>2</sup>; FRG-smallest indentation of the lateral profile between the rib cage and iliocristale; RA-just proximal to the anterior superior iliac spines; RAA-omphalion; RAF- waist level, preferred<sup>1</sup>; natural indentation<sup>2</sup>).†
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	88.72	8.85	<sup>1</sup> 88.87	9.57 <sup>2</sup>	RAA	86.22	8.80		
FRG			86.2	7.4	RAF	85.73	7.00 <sup>†</sup>	82.93	6.46 <sup>2</sup>
RA			82.30	7.72					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; required for the development of anthropomorphic analogues.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

† Waist level at the natural indentation is a marginal dimension. Waist level established by the subject (preferred) is essential only for Army women since it is required for procurement purposes. Waist level at omphalion is the dimension of choice.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WAIST CIRCUMFERENCE

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (Bureau of Home Econ.-average height of the inferior points of the 12th ribs; HES- "natural indentation" or one-half the distance between iliocristale and the bottom of the rib cage).†
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>74.04</u>	<u>11.30</u>
HES		
Men	<u>86.35</u>	<u>10.94</u>
Women	<u>73.20</u>	<u>10.79</u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of single- and lower-body garments; required for the construction of clothing manikins; required for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

†Waist level as measured in these two surveys are marginal dimensions. Waist level at omphalion is the dimension of choice.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST CIRCUMFERENCE OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the waist of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	66.23	5.28	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WAIST CIRCUMFERENCE OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal circumference of the waist over a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Not clearly defined in the report.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>*74.14</u>	<u>11.33</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: very few Army women wear foundation garments.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the type of foundation garment worn; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

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\*When the subject did not wear a foundation garment, the corresponding skin measurement was substituted in the data analysis.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST CIRCUMFERENCE, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the waist of a seated subject.
2. BODY POSITION: Sitting erect; feet unsupported.
3. LANDMARK(S): Omphalion.
4. INSTRUMENTS/EQUIPMENT: Tape
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	87.41	7.49
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: US Army '66        STATURE        WEIGHT        AGE         
US Army '77                            

COEFFICIENT OF VARIATION: US Army '66         
US Army '77       

1st and 99th US ARMY '66 PERCENTILE VALUES: MALE        and         
\*5th and 95th US ARMY '77 PERCENTILE VALUES: FEMALE        and       

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: considered marginal because its use is limited to snug-fitting protective equipment worn primarily in the seated position.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger waists than women.

G. REPRODUCIBILITY: A ☐ B ☒ C ☐

IF B OR C, THE PROBLEM IS: point of respiration at which the measurement is taken; the tension of the abdominal muscles.

H. PARTICULARLY SENSITIVE TO:

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST DEPTH

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the front and the back of the torso at the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (USAF '68, USA '77-preferred; USN '64-natural indentation; USAF '67-omphalion).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>17.01</u>	<u>1.67</u>	4 USAF '67	<u>22.31</u>	<u>2.18</u>
2 Army Women '77	<u>18.28</u>	<u>2.18</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>21.72</u>	<u>1.92</u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.123</u>	<u>.715</u>	<u>.213</u>

COEFFICIENT OF VARIATION:	US Army '66
	US Army '77 <u>12.1</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 14.4 and 25.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the construction of clothing manikins; useful for the design and sizing of single- and lower-body garments; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger waists than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST DEPTH OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The horizontal distance between the front and back of the torso at the level of the waist of a subject wearing a foundation garment.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Beam caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	15.65	1.85	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: 

	STATURE	WEIGHT	AGE
US Army '66			
US Army '77			

COEFFICIENT OF VARIATION: 

US Army '66	
US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: 

MALE		and	
FEMALE		and	

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☐  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken; tension of the abdominal muscles.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST FRONT LENGTH (ANTERIOR WAIST FRONT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front base of the neck and the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior neck (neck plan): USAF '68-level of the neck/torso juncture established by a "Texas" tie in a plane perpendicular to the long axis of the neck; USA '77-level of the neck/torso juncture established by a loop in a plane not perpendicular to the long axis of the neck); waist level (USAF '67-omphalion; USAF '68, USA '77-preferred).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Differences in landmark definitions.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>33.58</u>	<u>1.96</u>	4 USAF '67	<u>40.42</u>	<u>2.22</u>
2 Army Women '77	<u>36.73</u>	<u>2.62</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	<u>.368</u>	<u>.399</u>	<u>.135</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>          </u>
	US Army '77	<u>7.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 31.6 and 44.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a key dimension for the design, sizing, procurement and issuing of body armor; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definitions of the levels of the neck and waist; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WAIST FRONT LENGTH (ANTERIOR WAIST FRONT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front base of the neck and the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Anterior neck (neck plane: medial points of the right and left clavicles; waist level (average height of the inferior margins of the 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>32.74</u>	<u>2.26</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: a key dimension for the design, sizing, procurement and issuing of body armor; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of waist level; the definition of neck level; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (USN '64-natural indentation; USAF '68, USA '77-preferred; USA '66-iliocristale; USAF '67, USA '70-omphalion).
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

ALTERNATIVE DIMENSIONS: LEG OUTSEAM

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	100.28	4.50	4 USAF '67	106.47	4.72
2 Army Women '77	101.39	5.20	5 US Army '66	106.33	5.37
3 USN '64	107.38	4.56	6 Army Av. '70	106.03	5.03

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '77	.841	.392	-.016
		.897	.441	.016

COEFFICIENT OF VARIATION:	US Army '66	5.1
	US Army '77	5.1

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 93.6 and 119.2  
FEMALE 89.7 and 114.2

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems; useful for the design and layout of workspaces; useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to be less for this dimension than Blacks and greater for this dimension than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: definition of waist level.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WAIST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of the waist.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Waist level [CF-normal belt level (preferred); RA-just superior to anterior superior iliac spines; RAF-preferred<sup>1</sup>; natural indentation<sup>2</sup>].
4. INSTRUMENTS/EQUIPMENT: CF-anthropometer; RA, RAF-measuring rig.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of waist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>104.01</u>	<u>      </u>	RAA	<u>      </u>	<u>      </u>	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>107.40</u>	<u>5.14<sup>1</sup></u>	<u>11.66</u>	<u>4.82<sup>2</sup></u>
RA	<u>106.72</u>	<u>4.84</u>					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems; useful for the design and layout of workspaces; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level.



# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WAIST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the level of the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (average height of the inferior points of the 12th ribs).
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS: LEG OUTSEAM

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>101.73</u>	<u>4.95</u>
HES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>
HANES		
Men	<u>          </u>	<u>          </u>
Women	<u>          </u>	<u>          </u>

C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR RATING IN C IS: useful for the design and sizing of single- and lower-body garments; useful for the development of load-carrying systems; useful for the design and layout of workspaces; useful for the development of anthropomorphic analogues.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST HEIGHT OVER FOUNDATION GARMENT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the waist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Waist level (preferred).
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	100.80	4.40	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
US Army '66 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_  
US Army '77 \_\_\_\_\_ \_\_\_\_\_ \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: very few Army women wear foundation garments.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☐  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to be less for this dimension than Blacks and greater for this dimension than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WAIST HEIGHT, SITTING

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the sitting surface and the level of the waist.
2. BODY POSITION: Sitting erect.
3. LANDMARK(S): Waist level-preferred.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	23.37	1.73	4 USAF '67		
2 Army Women '77			5 US Army '66		
3 USN '64			6 Army Av. '70		

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and sizing of single-upper- and lower-body garments; of marginal value for the design and layout of workspace and the development of anthropomorphic analogues; Abdominal Extension Depth, Sitting is the preferred dimension for these purposes since it represents the height of the anterior point of the abdomen.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WAIST-STOMACH HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the stomach and the waist at the level of the maximum depth of the torso below the nipples.
2. BODY POSITION: Standing erect.
3. LANDMARK(S): Anterior torso point inferior to the ilion; waist level (the photograph of this dimension illustrates a preferred waist level).
4. INSTRUMENTS/EQUIPMENT: Sliding caliper.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>1.63</u>	<u>3.45</u>	RAA	<u>      </u>	<u>      </u>
FRG	<u>      </u>	<u>      </u>	RAF	<u>      </u>	<u>      </u>
RA	<u>      </u>	<u>      </u>			

C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: of no significant value for engineering anthropometry purposes. The standard deviation of the measurement indicates the lack of utility for this dimension.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: the definition of waist level.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WAIST-WAIST OVER SHOULDER

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical surface distance between the front of the waist and the back of the waist with the measuring tape passing over the shoulder.
2. BODY POSITION: Standing erect; shoulders relaxed.
3. LANDMARK(S): Waist level - preferred<sup>1</sup>, natural waist indentation<sup>2</sup>.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	_____	_____	RAA	_____	_____	_____	_____
FRG	_____	_____	RAF	<u>98.46</u>	<u>5.37</u> <sup>1</sup>	<u>89.47</u>	<u>4.12</u> <sup>2</sup>
RA	_____	_____					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

- D. REASON FOR THE RATING IN C IS: useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins; useful for the development of load-carrying systems.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

- F. PARTICULARLY SENSITIVE TO: the definition of waist level; the point of respiration at which the measurement is taken.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

### 1. DESCRIPTION: Weight recorded to nearest:

USN '64-	not designated	USAF '68-	*1 lb.
USA '66-	1 lb.	USA '70-	0.1 kg.
USAF '67-	1 lb.	USA '77-	0.25 lb.

### 2. BODY POSITION: Standing.

### 3. LANDMARK(S):

### 4. INSTRUMENTS/EQUIPMENT: Scale.

### 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: USA '77 (2a)-weight of subjects wearing bra and panties. USA '77 (2b) clothed subsample-most subjects wore fatigues and boots (10 percent wore slacks and shoes).

### ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>57.53</u>	<u>7.52</u>	4 USAF '67	<u>78.74</u>	<u>9.72</u>
2a Army Women '77	<u>59.92</u>	<u>8.51</u>	5 US Army '66	<u>72.16</u>	<u>10.59</u>
2b Army Women '77	<u>61.63</u>	<u>8.02</u>	6 Army Av. '70	<u>77.63</u>	<u>10.81</u>
3 USN '64	<u>77.75</u>	<u>8.66</u>			

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
		<u>.489</u>		<u>.207</u>
	US Army '77 (a)	<u>.536</u>		<u>.181</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>14.7</u>
	US Army '77 (a)	<u>14.2</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	<u>52.6</u>	and	<u>102.9</u>
	FEMALE (a)	<u>43.1</u>	and	<u>83.8</u>

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a key dimension for the development of anthropomorphic analogues; a basic body clearance dimension; required for the ejection seat safety and to establish structural strength criteria [USA '77 (2b) is the preferred dimension for these purposes]; an expression of nutritional status.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: the type of clothing, if any, worn (USN '64, USA '66, USA '70-boxer or jockey type shorts; USAF '67-nude; USAF '68, USA '77-bra and panties).

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WEIGHT (KÖRPERGEWICHT)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

### 1. DESCRIPTION: Weight recorded to nearest:

CF-	0.1 lb.	RAA-	not reported
FRG-	0.5 kg.	RAF-	0.5 kg.
RA-	0.1 kg.		

### 2. BODY POSITION: Standing.

### 3. LANDMARK(S):

### 4. INSTRUMENTS/EQUIPMENT: Scale.

### 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF	<u>76.97</u>	<u>11.73</u>	RAA	<u>74.00</u>	<u>10.40</u>
FRG	<u>76.3</u>	<u>8.9</u>	RAF	<u>75.04</u>	<u>8.81</u>
RA	<u>72.73</u>	<u>10.56</u>			

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

D. REASON FOR THE RATING IN C IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a key dimension for the development of anthropomorphic analogues; a basic body clearance dimension; required for the ejection seat safety and to establish structural strength criteria; [USA '77 (2b) is the preferred dimension for these purposes]; an expression of nutritional status.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

F. PARTICULARLY SENSITIVE TO: The type of clothing worn:

CF-briefs	RAA-briefs
FRG-gym shorts	RAF-briefs
RA-briefs (<50 gms.)	

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

### 1. DESCRIPTION: Weight recorded to nearest:

Bureau of Home Econ.-	not designated
HANES-	not designated
HES-	not designated

### 2. BODY POSITION: Standing erect.

### 3. LANDMARK(S):

### 4. INSTRUMENT EQUIPMENT: Scale.

### 5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Garments worn: Bureau of Home Econ- bandeau and cotton briefs; HES-stripped to waist without shoes (men's pockets empty) paper gown and paper shoes; men's clothing weighed "slightly" over 2 lbs.; HANES-measured without shoes, clothing weighed 0.20-0.62 lbs.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>60.55</u>	<u>11.78</u>
HES		
Men	<u>75.45</u>	<u>12.42</u>
Women	<u>61.77</u>	<u>13.49</u>
HANES		
Men	<u>78.05</u>	<u>14.53</u>
Women	<u>64.19</u>	<u>15.30</u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: a basic dimension of overall body size; a criterion for personnel selection; basic for population comparisons; basic for matching samples and selecting microcosms of populations for studies requiring like population distributions; a key dimension for the design, sizing, procurement and issuing of garments; a key dimension for the development of anthropomorphic analogues; a basic body clearance dimension; required for the ejection seat safety and to establish structural strength criteria [USA '77 (2b) is the preferred dimension for this purposes]; an expression of nutritional status.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the type of clothing worn.



# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WEIGHT, ESTIMATED

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The self-estimate of a subject's weight made shortly before its measurement.
2. BODY POSITION:
3. LANDMARK(S):
4. INSTRUMENTS/EQUIPMENT:
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION SOLICITED IN THE FOLLOWING U.S. MILITARY SURVEYS: CORRELATIONS WITH MEASURED WEIGHT

SURVEY	$\bar{X}$	SD	r	SURVEY	$\bar{X}$	SD	r
1 AF Women '68	56.88	7.18	.963	4 USAF '67	78.50	8.91	.974
2 Army Women '77	59.51	8.04	.964	5 US Army '66	73.20	10.56	.965
3 USN '64				6 Army Av. '70	77.51	9.88	.965
				7 AF Questionnaire Sur. '67			.925 (QE) *.971 (PME)

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE	EST. STAT.
	US Army '77	.487	.965	.206	.508
		.543	.964	.192	.543

COEFFICIENT OF VARIATION:	US Army '66	14.4
	US Army '77	13.5

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES:	MALE	53.0 and 103.1
	FEMALE	43.8 and 81.0

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: required to establish the validity of questionnaire surveys of Stature and Weight for detecting significant changes in body-size distributions.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☐ NO ☒  
IN WHAT WAY?

G. REPRODUCIBILITY: A ☐ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: individuals who know that their estimate will be checked will presumably respond with more care; time between estimate and its measurement may affect this dimension; (e.g., USAF '67 QE correlations may reflect typical changes between the end of the summer and middle of the winter).

\*Estimate (QE) from questionnaire survey administered during Oct. '66; pre-measurement estimate (PME) and measurement made during the survey period (Jan-March '67). (N=196).

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WRIST CIRCUMFERENCE, DISTAL\*

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the wrist at a level just below the bony prominences of the wrist.
2. BODY POSITION: Standing; elbow bent to anthropometrist's convenience; hand and fingers extended.
3. LANDMARK(S): Wrist level (USAF '68, USA '77-stylian).
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES: Different definitions of wrist level.

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	<u>14.96</u>	<u>0.71</u>	4 USAF '67	<u>17.59</u>	<u>0.92</u>
2 Army Women '77	<u>14.70</u>	<u>0.68</u>	5 US Army '66	<u>          </u>	<u>          </u>
3 USN '64	<u>          </u>	<u>          </u>	6 Army Av. '70	<u>          </u>	<u>          </u>

	STATURE	WEIGHT	AGE
C. CORRELATION WITH: US Army '66	<u>          </u>	<u>          </u>	<u>          </u>
US Army '77	<u>.464</u>	<u>.650</u>	<u>.051</u>

COEFFICIENT OF VARIATION: US Army '66	<u>5.2</u>
US Army '77	<u>4.7</u>

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE            and             
FEMALE 13.2 and 16.2

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## E. REASON FOR RATING IN D IS: useful as one in a series of dimensions required for the development of sizing systems/programs for gloves.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger hands than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## H. PARTICULARLY SENSITIVE TO: Definition of wrist level.

\*Distal to ulnar and radial styloid processes.

# ANTHROPOMETRIC SURVEYS OF FOREIGN MILITARY PERSONNEL

VARIABLE NAME: WRIST CIRCUMFERENCE, DISTAL\* (HANDGELENKUMFANG)

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the wrist at a level just below the bony prominences of the wrist.
2. BODY POSITION: Standing; hand and fingers extended.
3. LANDMARK(S): FRG-stylian, stylian ulnae; RAF-stylian ulnae.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DATA INDICATE DIMENSION MEASURED IN THE FOLLOWING FOREIGN MILITARY SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>	<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
CF			RAA		
FRG	<u>17.4</u>	<u>0.8</u>	RAF	<u>17.39</u>	<u>0.95</u>
RA					

## C. THOUGHT TO BE OF: Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR THE RATING IN C IS: useful as one in a series of dimensions required for the development of sizing systems/programs for gloves.

## E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of the level of the wrist.

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\*Distal to ulnar and radial styloid processes.

# ANTHROPOMETRIC SURVEYS OF U.S. CIVILIANS

VARIABLE NAME: WRIST CIRCUMFERENCE, DISTAL\*

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The circumference of the wrist at a level just below the bony prominences of the wrist.
2. BODY POSITION: Standing; upper extremity extended anteriorly; palm directed upwards.
3. LANDMARK(S): Styliion; styliion ulnae.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN FOLLOWING U.S. CIVILIAN SURVEYS:

<u>SURVEY</u>	<u><math>\bar{X}</math></u>	<u>SD</u>
BUREAU OF HOME ECONOMICS	<u>15.27</u>	<u>0.97</u>
HES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>
HANES		
Men	<u>      </u>	<u>      </u>
Women	<u>      </u>	<u>      </u>

## C. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

## D. REASON FOR RATING IN C IS: useful as one in a series of dimensions required for the development of sizing systems/programs for gloves.

E. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

## F. PARTICULARLY SENSITIVE TO: the definition of wrist level.

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\*Distal to ulnar and radial styloid processes.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WRIST CIRCUMFERENCE, PROXIMAL\*

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The minimum circumference of the wrist.
2. BODY POSITION: Standing; elbow bent to anthropometrist's convenience; hand and fingers extended.
3. LANDMARK(S): Minimum circumference of the forearm proximal to the ulnar and radial styloid processes.
4. INSTRUMENTS/EQUIPMENT: Tape.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68			4 USAF '67		
2 Army Women '77			5 US Army '66	<u>17.06</u>	<u>0.88</u>
3 USN '64	<u>17.03</u>	<u>0.80</u>	6 Army Av. '70	<u>16.86</u>	<u>1.03</u>

C. CORRELATION WITH:	US Army '66	STATURE	WEIGHT	AGE
	US Army '7	<u>.422</u>	<u>.630</u>	<u>.116</u>

COEFFICIENT OF VARIATION:	US Army '66	<u>5.2</u>
	US Army '77	

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE 15.1 and 19.3  
FEMALE \_\_\_\_\_ and \_\_\_\_\_

## D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: required for the development of anthropomorphic analogues; useful for the design and sizing of single- and upper-body garments; useful for the construction of clothing manikins.

F. RACE SENSITIVE? YES ☐ NO ☒ GENDER SENSITIVE? YES ☒ NO ☐  
IN WHAT WAY? Among men and women of like body size, men tend on the average to have larger wrists than women.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO:

\*Proximal to ulnar and radial styloid processes.

# ANTHROPOMETRIC SURVEYS OF U.S. MILITARY PERSONNEL

VARIABLE NAME: WRIST HEIGHT

## A. THE DIMENSION AND MAJOR ELEMENTS OF ITS MEASUREMENT:

1. DESCRIPTION: The vertical distance between the standing surface and the wrist.
2. BODY POSITION: Anthropometric standing.
3. LANDMARK(S): Stylium.
4. INSTRUMENTS/EQUIPMENT: Anthropometer.
5. SIGNIFICANT DIFFERENCES IN MEASURING TECHNIQUES:

## ALTERNATIVE DIMENSIONS:

## B. DIMENSION WAS MEASURED IN THE FOLLOWING U.S. MILITARY SURVEYS:

SURVEY	$\bar{X}$	SD	SURVEY	$\bar{X}$	SD
1 AF Women '68	_____	_____	4 USAF '67	86.58	3.94
2 Army Women '77	_____	_____	5 US Army '66	_____	_____
3 USN '64	_____	_____	6 Army Av. '70	_____	_____

C. CORRELATION WITH: STATURE WEIGHT AGE  
 US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

COEFFICIENT OF VARIATION: US Army '66 \_\_\_\_\_  
 US Army '77 \_\_\_\_\_

1st and 99th US ARMY '66 and '77 PERCENTILE VALUES: MALE \_\_\_\_\_ and \_\_\_\_\_  
 FEMALE \_\_\_\_\_ and \_\_\_\_\_

D. THOUGHT TO BE OF Essential, Useful, Marginal VALUE FOR A U.S. ARMY ANTHROPOMETRIC DATA BASE.

E. REASON FOR RATING IN D IS: useful for the design and layout of workspaces;  
 useful for the development of anthropomorphic analogues.

F. RACE SENSITIVE? YES ☒ NO ☐ GENDER SENSITIVE? YES ☐ NO ☒  
 IN WHAT WAY? Among Whites, Blacks, and Asians of like body size, Whites tend on the average to have shorter upper extremities than Blacks and longer upper extremities than Asians.

G. REPRODUCIBILITY: A ☒ B ☐ C ☐

IF B OR C, THE PROBLEM IS:

H. PARTICULARLY SENSITIVE TO: position of the upper arms.

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APPENDIX  
SUPPLEMENTARY LIST OF DIMENSIONS

## APPENDIX

### SUPPLEMENTARY LIST OF DIMENSIONS

A number of dimensions evaluated in this study were not measured in any of the 14 surveys reviewed in detail. Some of these measurements were found in one or more of the 20 other surveys scrutinized by investigators in the course of the study; others were identified by one or more clothiers, designers, or modelers, as being unavailable but needed for a particular purpose. Following are measurement descriptions for these 84 additional dimensions:

ABDOMINAL EXTENSION HEIGHT, SITTING	The vertical distance between the sitting surface and the anterior point of the abdomen of a seated subject. The landmark is located when the subject is seated.
ABDOMINAL EXTENSION- WALL DEPTH	The horizontal distance between the plane of the back (a wall) and the anterior point of the abdomen of a standing subject.
ACROMION-LATERAL HUMERAL EPICONDYLE LENGTH	The straight-line distance between acromion and the lateral epicondyle of the humerus, measured parallel to the long axis of the arm.
ACROMION-WALL DEPTH	The horizontal distance between the plane of the back of a subject standing with the shoulders against a wall, and the tip of a shoulder (acromion).
ARM REACH FROM WALL, MAXIMUM	The horizontal distance between the plane of the back (a wall) and dactylion of a subject standing with the left shoulder pressed against the wall and the right arm and hand extended as far forward horizontally as possible.
BALL OF HUMERUS- LATERAL HUMERAL EPICONDYLE LENGTH	The vertical distance parallel to the long axis of an arm between the center of the ball of a humerus and its lateral epicondyle.
BIGONION-CHIN PROMINENCE ARC	The surface distance between each corner of the jaw (gonion), passing over the anterior point of the chin. The subject sits.
BIGONION-SUBLABIAL ARC	The surface distance between each corner of the jaw (gonion), passing over the deepest depression between the chin and lower lip (sublabiale).
BITRAGION-CRINION ARC	The surface distance between the right and left tragon passing over the lowest point of the hairline (crinion). The subject sits.
BUSTPOINT/THELION- WALL DEPTH	The horizontal distance between the plane of the back (a wall) of a subject standing with the shoulders against the wall, and the bustpoint (women) or thelion (men).

BUTTOCK-TROCHANTERION, SITTING (HORIZONTAL)	The horizontal distance between a posterior buttock point and trochanterion of a seated subject. The landmarks are located when the subject is seated.
CALF DEPTH	The antero-posterior diameter of a calf of a standing subject at the level of its maximum circumference.
CERVICALE-BACK OF KNEE LENGTH	The distance between cervicale and the back of the knee (midpatella level) of a standing subject. The distance encompasses the superior curvature of the back and passes over the level of the maximum protrusion of the buttocks.
CERVICALE-BUTTOCK LEVEL LENGTH	The distance between cervicale and the level of the maximum protrusion of the buttocks of a standing subject. The distance encompasses the superior curvature of the back.
CERVICALE-TRAGION HEIGHT	The vertical distance between the base of the back of the neck (cervicale) and tragon. The head is in the Frankfort plane.
CHEST DEPTH AT SCYE	The horizontal distance between the back and the chest of a standing subject at the level of the inferior juncture of the arm and the torso (scye).
CHEST HEIGHT, SITTING	The vertical distance between a sitting surface and a bustpoint (women) or thelion (men).
CHIN PROMINENCE-TOP OF HEAD	The vertical distance between the anterior point of the chin to the plane of the top of the head. A headboard is used to measure this dimension. The subject's head is in the Frankfort plane.
ECTOCANTHUS-OTOBASION SUPERIOUS LENGTH	The straight-line distance between the outer corner of an eye and the upper point of the attachment of the ear to the head (otobasion superious).
ELBOW REST HEIGHT, STANDING	The vertical distance between the standing surface, and the bottom of an elbow (olecranon process) flexed 90 degrees. The subject stands erect with the upper arm relaxed at the side and the forearm and hand extended forward horizontally.
EYE HEIGHT	The vertical distance between the standing surface and the outer corner of an eye (ectocanthus).
FIRST PHALANX LENGTH (DIGIT III)	The length of the first segment of the middle finger between the surfaces of the third metacarpal and the second phalanx of a subject's fist.
FIST CIRCUMFERENCE (GRIP AXIS)	The subject's hand is held in a tight fist with the thumb lying over the knuckle of the index finger. The circumference passes over the thumb and the distal ends of the metacarpals.

FUNCTIONAL GRIP REACH	The horizontal distance between the plane of the back (a wall) and a rod gripped vertically in a hand. The subject stands erect with the shoulders against the wall and the arm extended forward horizontally.
FUNCTIONAL GRIP REACH, EXTENDED	The horizontal distance between the plane of the back (a wall) and a rod gripped vertically in a hand. The subject stands erect, extends an arm forward horizontally as far as possible while maintaining the opposite shoulder against the wall.
GONION-TOP OF HEAD	The vertical distance between the corner of a jaw (gonion) and the plane of the top of the head. The subject's head is in the Frankfort plane. A headboard is used to measure this dimension.
GONION-WALL	The horizontal distance between the corner of a jaw (gonion) and the plane of the back of the head. The subject's head is in the Frankfort plane. A headboard is used to measure this dimension.
GRIP AXIS HEIGHT	The vertical distance between a rod gripped horizontally in the subject's fist and the standing surface.
GRIP DIAMETER (OUTSIDE)	The distance between the joint of the first and second phalanges of the thumb and metacarpale III of a subject gripping a graduated cone at the level where the thumb and the tip of digit III just touch.
HALFWAY TO HIP CIRCUMFERENCE LENGTH	One-half of the surface distance between the level of the waist and the level of the hip, measured along the side of a standing subject.
HEAD DIAGONAL MAXIMUM (MENTON-NUCHALE)	The straight-line distance between the chin (menton) and the lower part of the back of the head (nuchale).
HEEL-LATERAL MALLEOLUS (HORIZONTAL) LENGTH	The horizontal distance between the plane of the posterior point of a heel and the lateral point of the lateral malleolus.
ILIOSPINALE-WALL DEPTH	The horizontal distance between the plane of the back (a wall) and an anterior superior iliac spine (iliospinale). The subject stands with the back and buttocks against a wall.
INDEX FINGER LENGTH	The vertical distance between the tip of the index finger and the center of the skin crease at the base of the index finger. The subject's hand and fingers are extended.
KNEE HEIGHT (INFRAPATELLA)	The vertical distance between the standing surface and the bottom of the kneecap (infrapatella) of a standing subject.

LARYNX-WALL DEPTH	The horizontal distance between the plane of the back of the head (a wall) and the most prominent point of the Adam's apple (larynx). The subject stands with the back and the head touching a wall with the head in the Frankfort plane.
LATERAL FEMORAL EPICONDYLE HEIGHT	The vertical distance between the standing surface and the most prominent point on the outside of the knee (lateral femoral epicondyle) of a standing subject.
LATERAL HUMERAL EPICONDYLE-STYLION LENGTH	The vertical distance between the bony prominence of the outside lower end of the upper arm (lateral humeral epicondyle) and the wrist (stylion). The subject's arm is relaxed at the side.
LATERAL NECK HEIGHT	The vertical distance between the standing surface and the side of the neck at its juncture with the shoulder. The subject stands with the head in the Frankfort plane.
LEG INSEAM	The vertical distance measured with a tape (as opposed to an anthropometer used to measure Crotch Height) between the crotch and a standing surface.
LEG OUTSEAM	The distance along the side between the level of the waist and the standing surface. The distance encompasses the curvature of the hips.
MAXIMUM FRONTAL-TOP OF HEAD	The vertical distance between the outside edge of a bony eyebrow (frontosupraorbitale) and the plane of the top of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
MAXIMUM FRONTAL-WALL	The horizontal distance between the outside edge of a bony eyebrow (frontosupraorbitale) and the plane of the back of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
MEDIAL FEMORAL EPICONDYLE HEIGHT	The vertical distance between the standing surface and the most prominent point on the inside of the knee (medial femoral epicondyle) of a standing subject.
MENTON PROJECTION	The straight-line distance between the chin/neck juncture and the tip of the chin (menton). The subject's head is in the Frankfort plane.
MINIMUM FRONTAL-TOP OF HEAD	The vertical distance between the maximum indentation of the temporal crests of the forehead (frontotemporale) and the plane of the top of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
MINIMUM FRONTAL-WALL	The horizontal distance from the maximum indentation of a temporal crest of the forehead (frontotemporale) to the plane of the back of the head. A headboard is used to measure this dimension and the subject's head is in the Frankfort plane.

NASAL ROOT HEIGHT	The vertical distance between the standing surface and the root of the nose (sellion). The subject stands erect with the head in the Frankfort plane.
NUCHALE HEIGHT	The vertical distance between the standing surface and the lowest bony point on the base of the back of the skull (nuchale). The subject stands erect with the head in the Frankfort plane.
OMPHALION-WALL DEPTH	The horizontal distance between the plane of the back (a wall) and the navel (omphalion). The subject stands erect with the back against the wall.
POSTERIOR SUPERIOR ILIAC SPINE HEIGHT	The vertical distance between the standing surface and a posterior superior iliac spine of a subject standing erect.
PUPIL-WALL	The horizontal distance between a pupil and the plane of the back of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
SPHYRION (FIBULARE) HEIGHT	The vertical distance between the standing surface and the bottom of the fibula (Sphyrion Fibulare) of a standing subject.
SPINE-MESOSTERNUM (see CHEST DEPTH)	The distance between the back and the breastbone at the union of the 3rd and 4th sternbrae (of the mesosternum), measured perpendicular to the long axis of a standing subject at the end of normal expiration.
TENTH RIB HEIGHT	The vertical distance between the standing surface and the lowest point of a 10th rib of a standing subject.
THIGH DEPTH	The antero-posterior diameter of the thigh at the level of the thigh/buttock juncture of a standing subject.
TRAGION HEIGHT, SITTING	The vertical distance between the sitting surface and a tragon of a seated subject. The subject's head is in the Frankfort plane.
TRAGION-PUPIL LENGTH	The horizontal distance between the pupil and a tragon of a seated subject. The head is in the Frankfort plane.
TRIGGER POSITION	The distance between the heel of a revolver-like measuring device and the trigger of the device with the subject's index finger on the trigger. The subject uses the preferred hand.
TROCHANTERIC HEIGHT, SITTING	The vertical distance between the sitting surface and the tip of the greater trochanter of the femur (trochanterion) of a seated subject. Trochanterion is located while the subject is in this position.

<p>TROCHANTERION- LATERAL FEMORAL EPICONDYLE LENGTH, SITTING</p>	<p>The horizontal distance between the tip of the greater trochanter of the femur (trochanterion) and the most prominent point on the outside of the knee (lateral femoral epicondyle). The subject sits and the landmarks are located while the subject is in this position.</p>
<p>TROCHANTERION- WALL DEPTH</p>	<p>The horizontal distance between the plane of the buttock (a wall) and the tip of the greater trochanter of the femur (trochanterion). The subject stands erect with the buttocks touching the wall.</p>
<p>UPPER ARM CIRCUMFERENCE</p>	<p>The circumference of the upper arm perpendicular to its long axis at a level one-half the distance between the tip of the shoulder (acromion) and the elbow (olecranon process). This distance is established with the upper arm relaxed at the side with the elbow flexed 90 degrees. The circumference is measured with the arm relaxed at the side.</p>
<p>UPPER EXTREMITY LENGTH</p>	<p>The vertical distance between the tip of the shoulder (acromion) and the tip of the middle finger (dactylion) of a subject standing erect with the arm, hands, and fingers extended at the side.</p>
<p>VERTICAL GRIP REACH, SITTING</p>	<p>The vertical distance between the sitting surface and the center of a rod gripped by the subject with the arm extended vertically over the head.</p>
<p>VERTICAL REACH</p>	<p>The vertical distance from the floor to the tip of the middle finger of a fully extended arm, hand, and fingers.</p>
<p>VERTICAL WRIST HEIGHT</p>	<p>The vertical distance between the standing surface and the wrist of the subject standing with the arm extended vertically over the head.</p>
<p>VERTICAL WRIST HEIGHT, SITTING</p>	<p>The vertical distance between the standing surface and the wrist of a seated subject with the arm and hand extended overhead.</p>
<p>VERTICAL WRIST HEIGHT EXTENDED</p>	<p>The vertical distance between the standing surface and the wrist of a subject standing with the upper extremity extended vertically overhead and the shoulder elevated to its maximum.</p>
<p>VERTICAL WRIST HEIGHT EXTENDED, SITTING</p>	<p>The vertical distance between a sitting surface and the wrist of a subject seated with the shoulder elevated and arm extended overhead.</p>
<p>WAIST DEPTH, SITTING</p>	<p>The antero-posterior diameter of the torso of a seated subject at the level of the navel (omphalion).</p>
<p>WAIST-FLOOR OVER BUTTOCK LENGTH</p>	<p>The distance between the waist and the floor, following the curvature of a buttock to the level of its maximum protrusion, and then dropping vertically to the floor.</p>

WRIST BREADTH (BONE)	The maximum straight-line distance between the radial and ulnar styloid prominences. Pressure is used on the measuring instrument to compress the tissue.
WRIST HEIGHT, SITTING	The vertical distance between the sitting surface and a wrist of a subject sitting with the arm extended downward at the side.
WRIST-CENTER OF GRIP LENGTH	The distance between the wrist and the center of a rod gripped vertically in the subject's fist.
WRIST-INDEX FINGER LENGTH	The distance between the wrist and the tip of the index finger. The subject's hand and fingers are extended.
WRIST-THUMB TIP LENGTH	The horizontal distance between the wrist and the tip of the extended thumb. The index finger touches the pad of the thumb and the forearm and hand are horizontal.
WRIST-WALL LENGTH	The horizontal distance between the plane of the back (a wall) and a wrist. The subject stands erect with the shoulders against the wall and the arm extended forward horizontally.
WRIST-WALL LENGTH, EXTENDED	The horizontal distance between the plane of the back (a wall) and the wrist. The subject stands erect, extends an arm forward horizontally as far as possible while maintaining the opposite shoulder against the wall.
WRIST-WRIST SPAN	The horizontal distance between each wrist of a subject standing erect with the back against a wall. The arms are extended laterally and horizontally to their maximum.
ZYGION-TOP OF HEAD	The vertical distance between the lateral point of the zygomatic arch (zygion) and the plane of the top of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
ZYGION-WALL	The horizontal distance between the lateral point of zygomatic arch (zygion) and the plane of the back of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
ZYGOMA-TOP OF HEAD	The vertical distance between a point on the antero-lateral curvature of the zygomatic bone (zygoma) and the plane of the top of the head. A headboard is used to measure this dimension, and the subject's head is in the Frankfort plane.
ZYGOMA-WALL	The horizontal distance between a point on the antero-lateral curvature of the zygomatic bone (zygoma) and the plane of the back of the head. A headboard is used to measure this dimension and the subjects's head is in the Frankfort plane.